Technology in the Ambient Age: back to Nature

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Abstract. This paper[1] presents an analysis of the vision behind Ambient Intelligence and the forms of interaction central to the vision (including agents and robots) from a philosophical perspective, trying to frame it into the terms introduced by Don Ihde to characterise the existential relations humans entertain with the world. We compare and contrast the ambient intelligent vision on technology with other ones.

1 PRECONCEPTIONS

Research into agents and robots, synthetic environments or ambient intelligence is given a particular appeal by the researcher and in particular the funding agencies that have to produce a vision of a better future that will profit from current investments in research and technology. What kinds of utopia are being put forward in the current visions on how we should ideally relate to technology? One could define Ambient Intelligence as the set of algorithms, technologies, applications, services, and real systems that have been built or that are being proposed. But we are concerned here with Ambient Intelligence as a particular way in which the phenomenological relations between users and the techniques defined as ambient are envisaged. What does it mean to be ambient in terms of the existential relations between humans and their technologically mediated lifeworlds. The third way to view the discourse on Ambient Intelligence is as a a political, ideological manifesto that provides a political agenda. This raises questions about what primitive, quasi-mythological or common-sense reasons are provided to justify the view: how is it made to appear as a natural, incontestable position; a truism. Why should we buy into the vision?

The Ambient Intelligence vision on what our world will (or should) be like in the future has its roots in philosophical preconceptions about what it means to be human and a teleological perspective that specifies what the "condition humaine" looks like that we should be heading for. The policitical, economical and cultural dimensions of this vision are described in the ISTAG [1] report, the IST Advisory Group. Also "The New Everyday" by Emile Aarts and Stefano Marzano [2] is concerned with a variety of perspectives on ambient intelligence. This book also does a good job in promoting the new philosophy. These are the primary texts that we take as defining the Ambient Vision. Among the opportunities that Ambient Intelligence offers, the ISTAG mentions: "modernising the European social model" and "improving Europe's economy". Ambient Intelligence will have an impact on governance and public services, civil security, the environment, mobility and transport. In short, Ambient Intelligence will bring us a new and better way of life**.**

Natural interaction, computational intelligence, contextual awareness, emotional computing, adaptive software: the components for intelligence mentioned in the ISTAG report, are all terms that relate not just to technologies as such but to their contexts of use. *Invisible, intelligent* and *interactive* are the key terms used in Stefano Marzano's introduction in the New Everyday. Ambient Intelligence is not a new "computing paradigm" and not just a new "interaction paradigm." It links certain enabling technologies to a model of computer mediated interaction. It is a philosophy about the powers of intelligent, invisible computing devices mediating between human praxis and the lifeworld. It defines how we should exist in the new future. But we could ask ourselves: Why intelligent? Why invisible? Why interactive? Are these the ultimate goals that we should go for that everyone accepts without further argumentation; the truths that we all hold to be self-evident?

2 TECHNOLOGY AND HUMAN NATURE

Technology is the collection of practices that humans employ to change themselves and the world they live in: their habitat. We invent technologies that protect us and make us survive in all kinds of conditions and we change our natural habitat to fit how we want to live. Don Ihde [3] suggests `technosystem' as a possible term for this human ecosystem.

In a way technology defines what we are. In the cyborg vision by artists like Stelarc who proclaims that the physical body is "obsolete" and in the Cyborg Manifesto by Haraway [4] our existence as hybrid creatures half nature – half machine is put to the fore hyperbolically. Stelarc's third arm is different from the prostheses that are common in medical practice nowadays (or the wooden legs of the past centuries) only in its surplus. Whereas a prosthesis *restores* a function of the human body that is lost, the third arm turns Stelarc into a new posthuman species. Stelarc wants to augment the human body with technology (the Six Million dollar Man) Our biological make-up is no longer able to survive in the technoworld we have created. It is time to reinvent and to rebuild ourselves.

In the Ambient Lifeworld, on the other hand, there is no need for surgery. The world itself is made into a new technological haven. It is made to the measure of man, made to fit our biological constraints, to understand what we want without asking and to serve our needs.

From a philosophical point of view, Stelarc and Haraway's position typically investigates the existential technological relations with the world that Don Ihde identifies as "embodiment relations". Technology is viewed as a way to extend the body.

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For these technologies, the ultimate design goal is *transparancy* in the sense that "the machine is perfected along a bodily vector, molded to the perceptions and actions of humans." The desire for these technologies is to become "truly me". The goal of *invisibility* set for technology in the Ambient Vision is a similar desire on a deeper level; a desire for the technology not intrude to much. A desire for the technology to disappear. However, the two visons differ in the way they think this should be realised and the kind of mediating relation between Self and World they think are most important for technology to serve.

So, the ambient intelligence view seems to aim for precisely those technologies that do not rely on the embodiment relations. Ambient Intelligence technologies do not intrude the body. Ihde presents the embodiment relation to technology schematically as (I-technology) → world. We could be tempted to define the ambient intelligence relation as: I → (technology-world). However, the ambient intelligent vision does not correspond to the use that Ihde makes of this reversed scheme. Ihde uses this schema to summarise what he calls hermeneutic technics. This is a second form of existential human-technology relation, where the technology makes the world appear as some kind of text to be read and interpreted. A prototypical example would be the thermometer: a physical device that translates temperature into numbers and allows us to 'read' off the temperature. Clearly this is not exactly the opposition to embodiment relations we have in mind to characterise the ambient vision, though, as we will suggest below, the hermeneutic relation might have an important role to play in the ambient intelligence vision but in another sense.

3 BACK TO NATURE

"The 1960s and 1970s brought to popularity a series of largely dystopian books that argued that Technology has outstripped human control and, like the Frankenstein myth, was runaway. Two of the most widely read such books were Herbert Marcuse's *One dimensional Man* and Jacques Ellul's *The Technological Society*. […] With this interpretation of technology, another popular belief is raised: that technology by being produced is *artificial* and the artificial is to be contrasted with the *natural*." (Ihde, p. 6).

In the 1990ies, Neil Postman reiterated this critique in, for instance, Technopoly [5] which includes a chapter on Computer Technology. But what if we are "artificial by nature" as Plessner [6] puts it? Perhaps we should not be so concerned about technology as the technophobes seem to be. In that case technology is just a fact of life. It seems hard for many people to agree with Plessner's position on humankind's artificial nature and the position of technology. It has become almost commonplace to oppose the terms nature and culture with science and technology as the major actors responsible for making us loose touch with nature. Technology is artificial. Artificial is bad. Nature is good and therefore natural interaction is as well.

The vision expressed in the ISTAG report or the New Everyday takes a very particular utopian stance on technology. Technology will save us or make the world a better place. But of course, in order for a vision to operate as a political manifesto there should also be a bad guy and the techno-dystopians cannot be wrong completely. Technology in its current form has alienated us from nature and our true selves. So we should get rid of it, in a certain sense. By making the technology *invisible* (cf Marzano's characterisation) the Ambient Vision makes the technology it introduces disappear at the same time. Ambient Intelligence promises to turn our daily lifeworld into a new Eden: "relaxing and enjoyable for the citizen". The New Adam is being served by invisible intelligence embedded in everyday objects. He will no longer experience the difference between nature and artifice. Technology and Nature have merged into an overall synthetic environment which we no longer experience as artificial. The post-rationalism expressed in the dystopian visions and postmodern thought is left behind to make room for a kind of neo-romantic view: back to nature.

The words nature and natural appear in slightly different contexts throughout the ISTAG report. First, in the design of interaction concepts, ambient intelligence strives for an ecologically valid approach, looking for natural environments of use. Second, natural interaction is seen as an important component for the Intelligence in Ambient Intelligence:

In the ISTAG report it is stressed that implementing the ambient intelligence vision should proceed by experience prototyping:

"Such facilities should enable prototyping of novel interaction concepts while resembling natural environments of use. These `experience prototyping' centres should also be equipped with an observation infrastructure that can capture and analyse the behaviour of people that interact with the experience prototypes."

This means, that the products and services should be conceived in constant interaction with their actual use by real users for which the experience of the product is as real as possible. Ethnomethodological approaches, user-centered design, usability engineering, ecological validity are key terms. Designers should look at nature, or at least to the natural way that people interact with things. (We should keep in mind Plessner's dictum though.) The focus on experience prototyping ensures that the general vision on making technologies withdraw becomes part of a general methodology.

4 ALTERITY

In line with the dictum of "don't change people, change the environment" the concept of Natural Interaction becomes an important notion. "Natural interaction that combines speech, vision, gesture, and facial expression into a truly integrated multimodal interaction concept" This use of natural relates to the way in which we interact with others. The technology is meant to be understanding, intelligent and interactive, in the way that people communicate which the each **other** face to face. So, at this point another kind of existential relation appears to become central in the vision, which Ihde calls *alterity*: "senses in which humans relate to technologies as relations *to* or *with* technologies, to technology-as-other."

This relation characterizes the concept of Ambient Intelligence as technology that can perceive you, understand you, react to you and that may have a mind of its own.

"I shall retain but modify this radical Levinasian sense of human otherness in returning to an analysis of human-technology relations. How and to what extent do technologies become other, or, at least *quasi-other*? At the heart of this question lie a whole series of well-recognized but problematic interpretations of technologies. On the one side lies the familiar problem of anthropomorphism, the personalization of artifacts."

Affective computing, or emotional computing as it is called in the ISTAG report is an important component in this respect as it is related both to understanding people and to mimicking people. The ISTAG report lists emotional computing as a key component for intelligence for Ambient Intelligence: "Emotional computing that models or embodies emotions in the computer, and systems that can respond to or recognise the moods of their users and systems that can express emotions."

Within the alterity relation as realised through emotional intelligence the environment becomes like another person that can also sense and interpret what I am doing. In this way the *hermeneutic* relation mentioned earlier becomes relevant as well, but the relation is turned upside down. It is not "I" that reads the world mediated through technology, but the world that reads me. This could be written as: I ← (technology-world) implying that the world through technologies (such as emotional computing) is able to perceive, interpret and understand ("read") us.

5 INVISIBLE INSTRUMENTS

The typical position of technology in the Ambient Intelligence vision is that of technology that dissappears into the background. Background relations are the third type of existential relation between man and technology, according to Ihde.

"The machine activity in the role of background presence is not displaying either what I have termed a transparency or an opacity. The "withdrawal" of this technological function is phenomenologically distinct as a kind of "absence". The technology is, as it were, "to the side". Yet as a present absence, it nevertheless becomes part of the experienced field of the inhabitant, a piece of the immediate environment." (Ihde, 109).

With technology becoming integrated in the world, a new technotope will start to exist which reminds us of Eden. The New Adam will not only talk to the trees again, but also to doors, cars, and coffeecups and what is more, this time they will be able to understand what he is telling them. The new world reverts to a kind of techno-atavism. But, for now at least, we know that the ghosts are of our own making.

A SMALL NOTE ON: IDEOLOGY - MYTHOLOGY – POLITICS

"Community building and new social groupings: while numerous studies indicate that the quality of social bonds is a powerful predictor of life satisfaction, people are increasingly living in a `mosaic' society where they are disconnected from family, friends, neighbours and both local and national democratic structures. AmI can reinforce participation of the individual in social networks."

"While AmI should not be promoted as a panacea for social problems, it does represent a new paradigm for how people can work and live together. AmI enables and facilitates **participation** by the individual -- in society, in a multiplicity of social and business communities, and in the administration and management of all aspects of their lives, from entertainment to governance. Radical social transformations are likely to result from the implementation of the AmI vision."

The ISTAG text does not provide details on what kinds of social transformations it expects from ambient intelligence, nor details on the properties of the technology that would lead to these reforms. What is interesting though, is the fact that "social transformations" are included as part of the vision on AmI. How do the radical social transformations caused by the implementation of ambient intelligence compare to the revolts from 1968, 1917, 1789? The terms Liberté, Egalité, and Fraternité, are reformulated as "participation", "community building", "supporting the democratic process", "civil security", "leisure, learning, work opportunities", "the delivery of public services", "social support". This kinds of discourse reminds one of what has been written about the impact the internet could have on political issues. The Enlightenment ideals of educated citizens that could debate issues and form a public opinion that could influence politics in a sense as described by Habermas, has often been presented in the context of the Internet. A new democratic society in which the citizen could participate without problems in the political arena. Although politics is one of the issues discussed on the Internet and some political movements (the anti-globalists) have been able to reach their strength mainly thanks to the global reach of the internet, there are no convincing proofs that the Internet has changed politics (local or global) to any great extent. The Internet is an enabling technology, that by itself bears no political bias. Undoubtedly there are more people that voice their opinions on all kinds of subjects and more people that an individual message reaches as an audience. Unfortunately, the ISTAG report does not provide convincing specifics on how ambient intelligence will further the political, democratic ideals of the Enlightenment but only shows itself as ideologically rooted in modernism with a neo-romantic twist.

6 CONCLUSION

Human Computer Interaction on a mundane interpretation concerns simply the study of the way people interact with computing devices and the engineering practice involved in building interfaces that suit the needs and practice of users. The Ambient Intelligent vision goes beyond simply designing producs for specific functions, establishing user requirements, task analysis, interface design, etcetera. AmI involves a particular concept of the nature of the relation between users and products or how people inhabit the technosystem, which I have tried to make explicit to some extent in more philosophical terms. In the visionary language of the ISTAG report, Ambient Intelligence researchers and engineers are also not merely building nicer interfaces, but are really social workers and political reformers.

Philosophical analysis, I feel is relevant to the design of human-computer interaction. It can make clear the various ways in which people relate to technologies from an existential

perspective. This has an important bearing on how we think of tools and their qualities. Designing or perfecting technologies that relate to users through embodiment will need to be evaluated in other ways than those that relate to users hermeneutically or that insist on making technology transparent, invisible and disappear into the background or those that want to appear as some kind of “other”.

Furthermore, as researchers and developers of human media interaction systems we should also at least be aware of the political dimensions of what it means when we try to sell or buy into ideas on “natural interaction” with agents, robots, or the disappearing interface.

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