

# Ambient Utopia

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**Abstract** This chapter presents an analysis of the ambitions that lie behind the concept of Ambient Intelligence as it is presented by the advocates and researchers working in the field. In particular it looks at the ideas regarding the forms of natural and intuitive forms of interaction that are envisaged - including agents and robots - from a philosophical perspective. The views on interaction are analysed and framed in the conceptual framework of Don Ihde's phenomenological analysis that describes how we as humans relate to the world existentially, mediated through the technologies that we construct. We compare and contrast the ambient intelligent vision on technology with some other ones.

**Keywords** vision, phenomenology, technology, agents and robots, interaction.

*In fact, most people believe that technology is a staunch friend. There are two reasons for this. First, technology is a friend. It makes life easier, cleaner and longer. Can anyone ask more of a friend? Second, because of its lengthy, intimate, and inevitable relationship with culture, technology does not invite a close examination of its own consequences. It is the kind of friend that asks for trust and obedience, which most people are inclined to give because its gifts are truly bountiful. -- Neil Postman, Technopoly, ([8], p. xii).*

## Introduction

Every so often - for instance when applying for a grant - the researcher into agents and robots, synthetic environments or ambient intelligence needs to explain why it is important to spend public money on the topic under investigation. The positive impact on the economy and the society has to be specified - albeit most often only in general, abstract terms. In the same way, the funding agencies accompany their calls for proposals and their programme texts with motivations that put the research programme into a wider economical, political and societal context. The project and programmes are given a particular appeal by the researcher and funding agencies that go beyond scientific and technological curiosity.

Of course the vision of a better future for society that will only come closer when investments are made in research and technology, does not only serve a marketing agenda; the vision may also be a true vision of an ideal situation. The topics that we will consider in this chapter question the underlying assumptions about what is considered *ideal* in the vision behind the Ambient Intelligence movement and in particular what is the ideal relationship between man and technology in the Ambient New World. For this the chapter turns to a philosophical analysis of the existential

relationships that we as humans entertain with the technologies that we produce and it makes explicit which kinds of relationships are valued more highly in the Ambient Intelligence vision and which are valued less.

It should be made clear from the start that this chapter should be read as an ideological critique in a positive sense aiming at a better understanding of the underlying thoughts behind the field and not as criticism.

## 1. Ambient Intelligence

One way to define Ambient Intelligence (AmI) is as a set of algorithms, technologies, applications, services, and real systems that have been built or that are being proposed by the researchers and developers that share the AmI vision. One can also think about 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? A third alternative way to view the discourse on Ambient Intelligence is as a political, ideological, perhaps religious manifesto that provides a political, economical and technological agenda. Analysing the latter two points of view one can address 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? How is the vision advertised? Why should one buy into the vision?

The Ambient Intelligence vision on what our world should or will be like in the future and what role technology has to play in it is perhaps not presented in academic philosophical terms but it does rest on implicit philosophical preconceptions about what it means to be human. It also encompasses a teleological perspective that has a clear view on what our current *condition humaine* looks like and on what the condition that we need to be heading for should look like.

The political, economical and cultural dimensions of this vision are described amongst others in the ISTAG [1] report by the IST Advisory Group. Another book that promotes the new philosophy is “The New Everyday” by Emile Aarts and Stefano Marzano [2], providing multiple perspectives on AmI, its roots, and its ambitions. These are the primary texts that we take as defining the Ambient Vision.

## 2. The ISTAG Report

Among the opportunities that Ambient Intelligence offers, the ISTAG report 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.

*According to the ISTAG vision statement, humans will, in an Ambient Intelligent Environment, be surrounded by intelligent interfaces supported by*

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*computing and networking technology that is embedded in everyday objects such as furniture, clothes, vehicles, roads and smart materials - even particles of decorative substances like paint. Aml implies a seamless environment of computing, advanced networking technology and specific interfaces. This environment should be aware of the specific characteristics of human presence and personalities; adapt to the needs of users; be capable of responding intelligently to spoken or gestured indications of desire; and even result in systems that are capable of engaging in intelligent dialogue. Ambient Intelligence should also be unobtrusive - interaction should be relaxing and enjoyable for the citizen, and not involve a steep learning curve. ([1], p. 8).*

The first thing to notice about this text is the following. 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. In Stefano Marzano's introduction to the New Everyday, the key terms are: *invisible, intelligent and interactive*. Ambient Intelligence is thus not a new "computing paradigm" and not just a new "interaction paradigm" although 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 envisions how we could exist in the new future.

Now the question one can ask oneself is: "Where do these ideas come from?" Why intelligent? Why invisible? Why interactive? Are these the ultimate goals that we should go for that everyone accepts without further argumentation? Why do these terms appeal to us?

### **3. Technology and Human Nature**

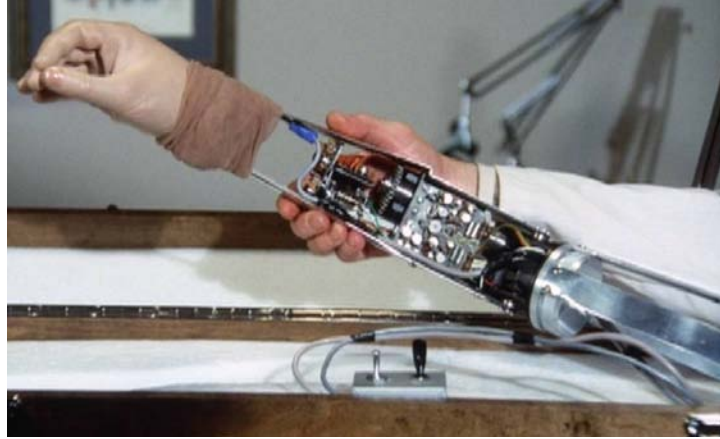
One way to define technology is as the collection of practices that humans (and possibly other animals) employ to change themselves and the world they live in: their habitat. We invent technologies that protect us and make us survive in all kinds of conditions and we change our natural habitat to fit 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 and who we are. One of the ways in which this becomes most visible is when technologies invade the bodies. Think about Steve Austin, also known as the Six Million Dollar Man<sup>3</sup>. The ideal of the bionic man was expressed in the opening of each episode.

*Steve Austin, astronaut. A man barely alive. Gentlemen, we can rebuild him. We have the technology. We have the capabilities to make the world's first bionic man. Steve Austin will be that man. Better than he was before. Better. Stronger. Faster.*

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<sup>3</sup> The Six Million Dollar Man was an American television series based on the novel "Cyborg" by Martin Caidin. It featured Lee Majors as Steve Austin, a former astronaut with bionic implants working for the "OSI" (the Office of Scientific Intelligence).



**Figure 1** Steve Austin's bionic arm. From the television series "The Six Million Dollar Man"

The bionic vision of the future has appealed to many artists, writers, movie makers and musicians. In the cyborg vision by artists like Stelarc who proclaims that the physical body is "obsolete" and in the famous Cyborg Manifesto by Donna Haraway ("I would rather be a cyborg than a goddess.") [4] our existence as hybrid creatures half nature – half machine is put to the fore hyperbolically. Stelarc has built exoskeleton's as part of an artistic project. His 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 reminiscent of the dream of the Six Million dollar Man. According to him, 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.

*We are living in an age of excess and indifference. Of prosthetic augmentation and extended operational systems. An age of Organs Without Bodies. Of organs awaiting bodies. There is now a proliferation of biocompatible components in both substance and scale that allows technology to be attached and implanted into the body. Organs are extracted and exchanged. Organs are engineered and inserted. Blood flowing in my body today might be circulating in your body tomorrow. [...]. The chimera is the body that performs with mixed realities. A biological body, augmented with technology and telematically performing with virtual systems. The chimera is an alternate embodiment. (Stelarc: "Excess and Indifference" [5]).*

Stelarc celebrates the possibilities of technology to enhance the body and puts his own body at the hands of the surgeons to create a new and better version of himself by way of artistic expression.

The dream of an enhanced body is not a big part of the AmI vision however. In the Ambient Lifeworld there is thus 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.

#### 4. Embodiment Relations

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. For these technologies, the ultimate design goal is *transparency* in the sense that "the machine is perfected along a bodily vector, molded to the perceptions and actions of humans." ([3] page 74). The appeal for such technologies arising from the experience of embodiment relations is described by Ihde as follows.

*It is the doubled desire that, on one side, is a wish for total transparency, total embodiment, for the technology to truly "become me." Were this possible, it would be equivalent to there being no technology, for total transparency would be my body and senses; I desire the face-to-face that I would experience without the technology. But that is only one side of the desire. The other side is the desire to have the power, the transformation that the technology makes available. Only by using the technology is my bodily power enhanced and magnified by speed, through distance, or by any of the other ways in which technologies change my capacities. The desire is at best contradictory. I want the transformation that the technology allows, but I want it in such a way that I am basically unaware of its presence. I want it in such a way that it becomes me. ([3], p. 75).*

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 to intrude too much. A desire for the technology to disappear. The credo in the ubiquitous computing programme that underlies part of the ambient vision talks about "obtrusiveness".

*Much of today's technology is still obtrusive in our homes and offices, in the shape of grey and black boxes - televisions, computers, appliances... These are set to disappear, as the technology becomes incorporated in our material environment, in the traditional objects we have surrounded ourselves with for millennia, such as tables, chairs, walls and ceilings. ([2], p. 8)*

The ideal of transparency in embodiment relations is similar to the invisibility and unobtrusiveness qualities in AmI but the technology that should make it possible is different. The two visions differ in the way they think this should be realised and the kind of mediating relation between Self and World they think is most important for technology to serve. What kinds of mediating relations between Self and the World are envisioned for technology in the AmI view?

#### 5. Ambient Technologies

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 follows.

(I-technology) → world

Technology and me become one and I perceive and act on the world through the technology that I have incorporated. We could be tempted to define the ambient intelligence relation as the reverse.

I → (technology-world)

The technology becomes part of the natural world and disappears. Although this would be a possible reading of this schema, it is not what Ihde uses it for. Ihde uses this schema to summarise what he calls *hermeneutic technics*.

Hermeneutical relations are a second form of existential human-technology relation. In the hermeneutical case, 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. A wind vane is similar. Other examples might include different forms of visualisation such as echoscopy<sup>4</sup>.



**Figure 2** Reading Nature

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. To realise the Ambient Vision, hermeneutic devices (sensors) are needed to observe human actions and the environment in order to make sense of what is happening without the need for explicit control.

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<sup>4</sup> There is an interesting relation between some of the hermeneutic technics such as the echoscope and technologies that would be classified as embodiment relations. Whereas microscopes and telescopes also make visible what is invisible with the naked eye, they are examples of an analogue technology that shares its bases with glasses. The echoscope and related technologies transform what they read (sound) into another modality. For more discussion see Ihde, pages 90ff.

## 6. 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. ([3] p. 6).*

But what if we are “artificial by nature” as Plessner [6] puts it? Given Plessner's perspective (echoed in the cyborg's vision by Harraway), perhaps we should not be too concerned about the artificiality of 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 lose touch with nature. Technology is artificial. Artificial is bad. Biological is good. Bionics is evil. 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. In order for a vision to operate as a political manifesto (or at least a motivation to spend money on its realisation) it should identify what is currently wrong and how the situation needs to be improved. 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 that lures us Back to Nature. Of course this New Nature can be completely artificial, but the technologies are invisible so we do not notice them.

The words ‘nature’ and ‘natural’ appear in slightly different contexts throughout the ISTAG report. First, the word is used in the phrase ‘natural interaction’. Given that black boxes disappear and given the fact that the current interaction technologies (typing, pointing, clicking) serve the convenience of the machine rather than ours, new interaction technologies need to be developed that build on our natural skills to interaction. The interface is where we directly experience and influence the world/technology and therefore interaction is a prime concern and an important component for the Intelligence in Ambient Intelligence.

*Natural interaction that combines speech, vision, gesture, and facial expression into a truly integrated multimodal interaction concept. ([1] p. 15)*

A second context in the ISTAG report in which the word natural appears is in the discussion of the design of interaction concepts. Ambient intelligence strives for an ecologically valid approach, looking for natural environments of use. 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. [1]*

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.

## 7. Alterity

The typical natural interaction techniques that are proposed in AmI are those that we naturally use to communicate with other fellow humans. The technology is meant to be understanding, intelligent and interactive, in the way that people communicate which each *other* face to face. This implies that the machines and technology that we communicate with in this natural way also have to become like us. They have to have similar skills in sensing, interpreting (mind-reading), and expressing as ourselves.

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. This range of anthropomorphism can reach from serious artifact-human analogues to trivial and harmless affections for artifacts. (Ihde, [3] page 98)*

In Section 4, we quoted Marzano from the introduction to "The New Everyday", saying that the grey and black boxes in our homes and offices will disappear and the technology will become embedded in the everyday objects such as tables and chairs, walls and ceilings. Marzano continues as follows, taking the stance that fits with the alterity position of technology.



*As technology becomes hidden within these static, unintelligent objects, they will become subjects, active and intelligent actors in our environment. ([2], p. 8)*

Our relations with computers as *Others* has been explored from a psychological point in *The Media Equation* by Reeves and Nass [7].

*[W]e have found that individuals' interactions with computers, television, and new media are fundamentally social and natural, just like interactions in real life. The key word is "fundamentally." Everyone expects media to obey a wide range of social and natural rules. All these rules come from the world of interpersonal interaction, and from studies about how people interact with the real world. But all of them apply equally well to media. ([7] p. 5).*

The "serious artifact-human analogues" referred to in Ihde's quote, comprise, amongst others, the analogues between humans and machines that form the core idea behind artificial intelligence and agent technology according to Ihde. However, one can also entertain the opposite view that AI does not treat machines as if they were humans, but rather that the core idea behind AI or more precisely cognitive science is that humans are like machines. Postman's [8] critique on technology vehemently opposes this tendency.

*[I]t is the dominant metaphor of our age; it defines our age by suggesting a new relationship to information, to work, to power and to nature itself. That relationship can best be described by saying that the computer redefines humans as "information processors" and nature itself as information to be processed. The fundamental metaphorical message of the computer, in short, is that we are machines - thinking machines, to be sure, but machines nonetheless. It is for this reason that the computer is the quintessential, incomparable, near-perfect machine for Technopoly. It subordinates the claims of our nature, our biology, our emotions, our spirituality. The computer claims sovereignty over the whole range of human experience, and supports its claim by showing that it "thinks" better than we can. ([8], p. 111)*

## **8. Alterity, Understanding and Hermeneutics**

The natural, multimodal forms of interaction that are mentioned in the ISTAG report, using speech and nonverbal communication, require further research into natural language processing, speech recognition and speech generation, but also computer vision for action and gesture recognition or recognition of facial expressions. The technological *Other* can take the form of humanoid robots or virtual humans with which we can have conversations, that understand what we are saying, that act as companions, that can read our emotions, empathise, etcetera. This extreme form of alterity is perhaps not the one that is most widely advertised in the AmI vision because it clashes somewhat with the idea that technology should disappear in the background. However, the skills such as sensing, interpretation and affective understanding are highly important in the Ambient Environment.

Affective computing, for instance, 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. ([1])*

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, although it may not appear as a person. A typical scenario that is often sketched is one where the atmosphere in the house adapts to your mood through the choice of ambient lighting. For this it is important that there are unobtrusive sensors that can read your mood and sense what activity you are involved in. In this way the *hermeneutic* relation mentioned earlier becomes relevant as well in the AmI scenario.

## **9. Invisible Instruments**

The typical position of technology in the Ambient Intelligence vision is that of technology that disappears into the background. Background relations is a name given by Ihde to yet another type of existential relation between man and technology.

*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. ([3], 109).*

The typical technologies that function in the background are automatic and semiautomatic machines.

*In the mundane context of the home, lighting, heating, and cooling systems, and the plethora of semiautomatic appliances are good examples. In each case, there is some necessity for an instance of deistic intrusion to program or set the machine into motion or to its task I set the thermostat; then, if the machinery is high-tech, the heating/cooling system will operate independently of ongoing action. ([3], p. 108)*

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 where tables and chairs become subjects and actors. Perhaps rather than talking about Adam, one should talk about Aladdin. Much of the AmI view of technology is reminiscent of a spirit world, where instead of rubbing your wonderful oil lamp, you talk to the Djinn in your chair.

Marzano's nostalgia does not go so far back. With the grey and black boxes out of the way our living space can go back to what it should be.

*This means that in advanced societies the living space of the future could look more like that of the past than that of today. Through the ages, our homes have contained the objects that are most relevant to human life - chairs, tables and beds, for instance. We have walked on floors, sheltered from the elements under roofs and behind walls. Although these may take different forms in different cultures, climates and times, their basic form is timeless, and our distant descendants will still use them. But the technological boxes of today - the TV, radio, telephone and computer - are temporary. While their function is timeless - entertaining and informing, helping us to remember and communicate - their form is not, since that form does not relate to our physical or psychological needs. ([2], p. 9)*

## 10. AmI: a Critical Analysis

The previous sections have tried to dissect the vision of Ambient Intelligence with the view of discovering what kinds of mediating relations technology ideally plays between humans and their lifeworld. Although some of the analyses may have been critical, it was not intended to imply a negative stance towards the AmI vision, but to raise an awareness of what the AmI discourse shares with myths and grand stories that capture our imagination. In particular, we wanted to point out how the AmI vision favours some forms of technological relations above others.

There is a side to the Ambient Vision that was not discussed so far which is not so much focussed on the micro level interactions between the individual and the technology, but a side that looks at the wider picture and the socio-economical implications of the introduction of AmI technology.

*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. ([1])*

The kinds of politics advocated in the report echoes the ideas that accompanied the rise of the internet.

*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. ([1])*

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 Aml. 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, have 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, some people would claim that there are no convincing proofs that the Internet has changed politics (local or global) to any great extent. Whereas in the early years hacktivism was an active force on the internet, the current internet seems the domain of Friends on FaceBook or entertainment through YouTube. The social effects of the implementation of the Aml vision are still guess work. However in declaring the wish for more participation, the Aml vision reveals itself as continuing the modern tradition.

## 11. Short Summary

In the Ambient Lifeworld, some technologies are promoted more than others. In the previous sections we have used Don Ihde’s classification of human technology relations to point out these preferences.

**Table 1** Ihde's relations in the Ambient Vision

<i>Embodiment relations</i>	Whereas in the seventies and eighties the technological dream (and nightmare) was that of the bionic man; embodiment technologies are not the focus of the Aml vision. Their invasive character makes them fit less in the ambitions of a natural world.
<i>Hermeneutic technics</i>	The Aml vision reserves a special place for technologies that focus on “hermeneutics”: those that can interpret what activity we are engaged in and that can guess what we want. Sensing technologies are at the core of the ambient technologies.
<i>Background relations</i>	The ideal technology from the point of view of Ambient Intelligence is one that has become invisible, that has disappeared in the background. The thermostat (a combination of a background with a hermeneutic relation) is the prototypical case.

<i>Alterity</i>	Alterity relations play a key part in the ambient vision. In particular, the “intelligence” part covers skills that make the technology appear as if it possessed human skills. The predominant perspective is not however that of a world embodied with robots and virtual humans - the ultimate “others” technology.
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The Ambient Lifeworld is seemingly a natural lifeworld where the technology has disappeared. It is not gone but it has become invisible. The world is full of invisible technological spirits that tune into our thoughts and feelings and serve our needs without fail. One of magic, of fairies. The world is real - not virtual - and remains looking natural.

## 12. Conclusion

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. 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 products 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. Ihde’s analysis of the mediating relations of technology is one way to make this explicit in more philosophical terms.

Philosophical analysis may be 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*.

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