

minds, ideas and emotions, and systems can derive knowledge from the connections made.

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## Ambient Technology and Social Progress: A Critical View

Dick van Lente and Ernst Homburg

Ambient Intelligence is usually presented by the electronics industry as its next great gift to humanity: a whole new range of possibilities in information provision, communication and entertainment, accessible anywhere at any time, and perfectly adjusted to the users' individual needs. A critical understanding of this technological promise requires that we analyze the cultural and economic sources from which it springs, the ideas about ambience and individual needs on which it is based, its promised effects and possible alternative uses.

The primary source of Ambient Intelligence is, like all industrial innovation, the pressure of competition, which in the electronics industry is particularly severe. In response, the industry searches for needs that people with sufficient purchasing power might have in the future. Technology that would respond 'intelligently' to individual needs and connect people to the electronic services that satisfy these needs would seem to be a logical and profitable answer from the industry's point of view. There are, however, three important problems with the Ambient Intelligence paradigm in this form.

In the first place, the industry assumes that the devices that will surround future consumers will 'learn' from people's behaviour in such a way as to adapt to them and anticipate their needs. In view of the fact that communication between humans is multi-layered and ambiguous, and therefore often full of misunderstandings and failed attempts to 'learn' from each other, it is very unlikely that electronic systems will ever learn to interact with people in a 'natural' way. Moreover, in the utopian projections put forward by the industry – such as the automatic switching on of a video connection to the children's playroom as soon as the mother enters the home – assumptions about human needs are made that differ considerably from ideas people generally have, both about their relation with technology and with their fellow humans. Most parents, for example, will prefer to make their own choices about having a look into the children's room, and would be quite annoyed when the technology chose for them.<sup>1</sup>

Secondly, while some features of Ambient Technology are based upon naïve ideas



Dick van Lente  
'Criticaster'



Ernst Homburg  
'Criticaster'

about human psychology and social life, others are superfluous: they are either taken care of by present technological systems – the Internet, DVD, mobile telephones and so on – or are so far out (like projecting a sunset on one's windowpane) that only the very few who don't know what to do with their money will care to buy it. Geared as it seems to be to the affluent, much of Ambient Intelligence looks like superfluous 'gadgets for the rich'. The impressive technological advance it represents – making electronic systems practically invisible and ubiquitous – does not contribute to cultural or social progress.

The last point raises a third problem, which is basically of a moral nature. If 'improvement of the quality of life', which is the alleged social goal of these efforts, is not in fact realized, it seems a great waste of human energy. Meanwhile it is clear that there are many real needs in the world today to which Ambient Intelligence could be a useful response. Ambient Intelligence seems to offer possibilities to monitor environmental changes more extensively than is now possible, creating a firmer basis for environmental policies. Facilitating communication could reduce transportation and therefore pollution – an old ambition that new technology might help come true. Easy access to information and culture might be a boon for the lonely and disabled, which requires an effort to make these technologies cheaper. Cheapness would also be a goal for teaching aids, especially in the third world, which could provide for real needs in terms of professional training, instruction in family planning and general education: we are often reminded by experts in underdeveloped countries that a lack of education is at the basis of problems in public health, environment and ethnic conflicts.

Work aimed at these goals will require some public financing because it is directed at public problems or the needs of the poor or not so wealthy. On the other hand, these are needs that are worthy of the efforts of the teams of very intelligent people that work in the research laboratories of the electronics firms. They are likely to provide a more certain market than the hype among the wealthy that Ambient Intelligence now seems to aim at, even though it may be a less profitable market in the short run.

1 E. Aarts, R. Harwig and M. Schuurmans, 'Ambient Intelligence', *After Cyberspace: When Computing Becomes our World*, ed. P.J. Denning (ACM Press, 2001)