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## Localisation versus Globalisation – Claim and Reality of Mobile and Context-aware Applications of the Internet

### Abstract:

In the vision of ubiquitous computing it should be possible to create situational and context-aware applications of the internet. But there is a conflict between the global claim of the system and the context-aware local application. First of all it must be clear, what context means. Is the context determined by the material local environment or by the special intention of a person's action. What role do cultural factors with their historical implications and scales of value play? The meaning of locality depends on the definition of the term context. Thus the term locality specifies an analogy to the term 'context'. It is necessary especially to also clarify categories like "Leib" and "Lebenswelt". Finally it is pointed out that special claims of ubiquitous computing like the idea of a global world-model are untenable. Though ubiquitous computing technologies are calm and invisible, it is important to make visible their components. The antagonism between localisation and globalisation shows the real potential of, as well as the claims of, ubiquitous computing.

### Agenda

What is the vision and the claim of Ubiquitous Computing?

What is a context-aware application?

What is the local?

What is the global?

How much global moments are in the local, how much local moments are in the global?

Are the claims of Ubiquitous Computing really justified?

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In 1991 Mark Weiser first used the term Ubiquitous Computing. The term is intended to describe a mobile application of local and non-local information without the constant presence of hardware. The interface between humans and computers would disappear. The visible reality would be augmented with information, which are accessible everywhere. The user is online permanently and connected with local information services and with the global internet. These ideas are becoming more differentiated now. The German Centre of Excellence 627 Nexus "Spatial World Models for Mobile Context-Aware Applications" at the University of Stuttgart focuses specifically on ubiquitous computing. The focus here is context-awareness, which is realised by spatial world models.

The term glocalization means that localisation and globalisation need not be an antithesis in a global network. Globalisation as a global integration of markets and the consideration of a local identity can exist side by side. But now the question is whether the term glocalisation hides an antagonism. Perhaps this notion articulates a typical fallacy of the first world. It depends on the belief that science, technology and the economy is the basis for every kind of weltanschauung. In the idea of glocalization local premises are seen as global ones. Therefore the local, that means the ordinary "Lebenswelt", is not seen in opposition to the global claims of a global network because the local existence derives from global expectations. But my thesis is that there is a fundamental antagonism between localisation and globalisation. And because of this antagonism it is possible to show the real possibilities and the untenable claims of ubiquitous computing.

By answering following questions this thesis becomes clear:

1. What is the vision and the claim of ubiquitous computing?
2. What is a context-aware application?
3. What is the local?
4. What is the global?
5. How much of the global is contained in the local, how much of the local is contained in the global?
6. Are the claims of ubiquitous computing really justified?

## What is the vision and the claim of Ubiquitous Computing?

Marc Weiser believes that the future world will become smart using wireless connected computers without visible hardware. All things will be augmented with information. Things have their own memory and can hold a dialogue with other things close by. Because the hardware is disappearing you can't see an interface. Everywhere and in every situation you can use information for your actions. Maybe the screens are eye-glasses or the display on the mobile phone; maybe we see some information displayed on walls. With the help of nanotechnologies it will be possible to have nearly invisible miniature computers, which obtain information from the environment via sensors. Moreover, our actions will be supported by autonomous information agents, giving us different services. For example, they will help us driving a car, manage our agenda by teamwork with other agents. We are free for more important things, whatever these things may be. Our lives will be highly efficient. Whether this efficiency is really in our interest is another question. Distributed systems accompany us everywhere like a personal angel. Nowadays, three concepts are used to describe this development in information science. Beside ubiquitous computing there are the concepts of 'pervasive computing' and 'ambient intelligence'. But the differences are rather small. Each concept differentiates itself, yet is necessarily interconnected with all others. Weiser's idea of ubiquitous computing means a calm technology working in the background adapted to our behaviour. This technology is able to interpret behaviour. Now our physical mobility can be always online, always connected. The concept of pervasive computing is mostly used in commercial contexts. But the concept emphasises that the whole world is penetrated by information. The physical reality is now augmented with information and affects animated and non-animated entities in the same way, from slaughtered beasts to human patients. Thus our behaviour will be better, namely more rational and effective.

The concept of ambient intelligence is used mostly in EU projects. This concept emphasises the social embedding of technology more than the others. In everyday life we need specific information. Taking a walk on a sunny summer day requires different information than taking a walk on a rainy day in autumn. Going by car in rush-hour needs different information than going by car on a holy day like Easter. At least the term intelligence intends that personal informations be given confidentially.

Indeed it is a problem that the ideas of an augmented reality need, so to speak, the individual to be the donor of information. The individual is not only the user of information, he is a part of the world which is logged by sensors.

Thus each of the three concepts has its own justification but at least they focus on the same technology. The historical first concept is called ubiquitous computing; and so I will use this concept in the following argumentation.

Applications are mostly are inspired by the idea that we can make a digital double of the real world. All spheres of life – the public one and the private one - will be promoted, connected and organized more efficiently by ubiquitous computing. Every behavioural intention would obtain the right information everytime and everywhere – in other words the information, which is adapted to the context of behaviour.

In brief, I will list the essential characteristics of ubiquitous computing:

- Disappearance of hardware due to its integration in the things of everyday life;
- Context-awareness of the systems;
- Adaptability of the systems to users;
- Connectability of information with the physical handling of things around me;
- Augmentation of the physical environment with information;
- The system's ability to self-organise;
- Mobile application of systems by wireless connection;
- Connection of local and global information.

## What is a context-aware application?

Rothermel, Bauer and Becker, three scientists, which research in the Nexus project give a definition for the term context: "Context is the information, which can be given for characterising the situation of an entity. Entities are persons, places and objects, which are relevant for our behaviour or our application." First of all the scientists start from the idea that a situation can be understood by what is called information. But there is no agreement on what information actually means, neither in information science nor in computer science. But even if we did establish a common term, the

question arises whether feelings, moods and unarticulated dispositions of the "Leib" can be signified as information. Furthermore it is ascertained that this information constitute relevant data. But what is relevant in a situation? Consider, for example, a shopping experience in this country and in the Orient. I think that makes clear that even simple intentions and actions are connected with fundamental cultural differences. In particular our idea of efficiency plays a less important role in other cultures. Instead shopping is a kind of social game.

Let us answer the question, what characterises the context of a situation. There are some options for questioning and answering:

- a. Is context the material environment, which can be caught by physical sciences?
- b. Or is context this material environment with its historical, social und value implications; in other words, is context what is called "Lebenswelt"?
- c. Or is context an acting relevant personal disposition, that means is it my individual history, my preferences and my values which are characterising the context?
- d. Or is context a stereotype of a user or of a special situation of application in the sense that a person has to do this and that?

The last question shows that smart technologies are not adapted to an individual, but to a fixed type of consumer. Even the idea that my usual shopping list is displayed on a screen on my shopping trolley is a problem. My preferences are constantly changing. And is shopping really only an issue of efficiency? Even in a supermarket we sometimes just want to browse. The idea that we can get information for comparing products presupposes an individual who can rate this information. But this is not possible in a complex society. And I do not believe that a supermarket would promote an information system, which dissuades customers from purchasing a particular product in its supply. Thus in the contextual focus of ubiquitous computing there exists only a specific cultural standard type of consumer.

Another problem is the idea of an adaptive system, which is able to interpret situations. In pressing performances it is not possible to have long and difficult dialogues with a system. Indeed it is a great danger that a self-interpreting system would issue wrong information. That depends at least on the

fact that up to now we have not succeeded in implementing a historical sense in a system. A historical sense is knowing when an event cannot be logged in the usual way. Incidentally, this is a classic problem for Artificial Intelligence. A system, which can do everything humans can do would not function in the manner of linear rationality. That means in some situations it would prefer to hope instead of to do, probably it would light a candle in a church instead of taking action.

Thus it is indeed difficult to define what a context-aware application is. Nevertheless, the fourth type probably is the most widespread in the sphere of ubiquitous computing. It certainly depends on the fact that this type is easy to for a system to comprehend. Context aware applications seem to be mostly typical applications. And naturally, local typologies play a main role here. Information which is distributed in the environment is information for a typical user, who is well acquainted with the environment. Naturally this kind of familiarity can become rather abstract. Then, for example, it is the familiarity of a geologist in the Arctic Circle. Thus the user gets only typical information regarding his own standards of behaviour and individual habits. In principle, there is a limit to contextual differentiation, which depends on qualitative changes in the individual. But without question when using ubiquitous computing the definition of the local plays a major role.

## What is the local?

From the view of an ubiquitous computing user the local is characterised by the moment of physical proximity. This means fundamental relevancies which are characterised by the presence of my "Leib". As an user I am physically mobile. I need some specific information which is useful where I am. Thus the "Leib" is a central aspect of relevancies, if you look to information from the aspect of behaviour because only using my "Leib" can I initiate something. But it is important to imagine this category of "Leib" as a central determinant in the definition of the local, not in an abstract way, which only orientates the world according to proximity and distance and to left and right. The "Leib" is a historically disposed part of the natural world which has its own memory. It is possible to develop the "Leib" or to differentiate it or to extend it by prosthesis, indeed also by medial apparatus, which increases our physical capabilities. The physiologists Semon and Hering stated in their theory of "mneme" in the late 19th century that the

"Leib" not only has its brain as memory, but rather the whole of animated matter has memory. Furthermore the "Leib" is culturally disposed. Every culture develops its own gender specific ideals of the "Leib". Specific abilities are preferred, others are neglected. In the "Leib", so to speak, culture is articulated, its sensibility, its views and its hardness. Thus the local is characterised not only by a geographic primacy, but also by a cultural primacy. That means that the local is essentially characterised by our physical presence. The environment is rendered meaningful by the culture and history which is embodied in my Leib. Thus the local is loaded with something which is not part of the material environment in an immediate sense. The landscape in front of my eyes is focussed in a romantic, threatening or economic way. To this extent I embody my individual history in my "Leib", but also the history of the culture in which this "Leib" is developed, insofar as the local is always disposed by the non-local. But this non-local is not the global, but something which stands out from my culture in the local, which is embodied by myself. That means it is something specific, which need not have a global claim.

The local is characterised by my physical presence and its cultural loading. The local is respected to my ability to recognize and to effect. Insofar as the local is a common constituent it is respected as a special cultural type. Thus the local is a diffuse and not clearly limited horizon, in which I can act according to a familiar pattern. My capacity of perception and of effect can extend across the local via apparatus or media. My capacity of perception transcends the limits of the immediate sensual perception to a horizon which indicates a mood or an atmosphere. In this diffuse line of horizon is a divergence of the sensual perception and the intellectual destination. For our discourse it is important to see that the local is not only a situated destination, but is articulated in this reference to non-local as a diffuse line of horizon.

Sensor data from the material local environment is gathered by quantitative physical methods and attached to a culture with specific schemes. But naturally the order of things need not correspond to the order of modern physical classifications. The ancient Chinese divided animals into those which could be hunted by the emperor and those which could be hunted by common people. Other cultures divide animals into sacred ones and ones which can be eaten by people. The ancient Greeks divided people into Greeks and barbarians, whereby the

latter were not considered human in the same way as the Greeks.

Let us answer the fourth question:

## What is the global?

The opposite term to the local is the global. It means anything which is not bound to a place and which is independent of physical and cultural contingences. It also means anything which has a global claim. First we noticed that physical entities, physical laws and data are generally accepted and have a claim to objectivity. But this general acceptance and claim to objectivity results from a reduction and quantification of the observed phenomena. But physical data stands not in the context of acting outside the scientific sphere. Only with a special cultural stamp, in other words, with a user's cultural training do they achieve relevance in behaviour. The physical view to the world is, in spite of an over-arching cultural claim, an articulation of a specific occidental disposition. That means that the primary subjective experiences receive an historical unloading, in other words, an unloading of content. The subject exists only in a position of representation. I am an observer of an experiment only as a representative of entire humanity. I obtain the right result only by following a specific method, which I cannot vary.

But the global today is firstly an economic claim, which means that products can be produced and consumed under the same conditions worldwide. Indeed, it is a culturally disposed claim, which can be realised only by removing cultural differences under the premises of the leading market of North America. The concept which describes this removal is "homogenising markets". This economic undertaking is enforced by monolinguality including the systems of categorisation and premises of value which are connected with it.

The global is disposed to a view of the world, which can be characterised by the following:

- quantification and economisation of all spheres of life;
- monolingualism;
- removal of cultural differences through the homogenisation of markets;
- removal of local identities if they hinder economic activity.

But, on the other hand, local identities can inspire the global market. And these local identities are welcome. Naturally it is good for the market to commercialise local musical traditions under the label of world music. But it is important that this music is consumable. One of the greatest problems for globalisation is religious disposition. Thus religious holy days are questioned by the economy because they hinder production, distribution and consumption. The economy does not know the Lord's Day, but it does know 'Wellness Day' because this is a day of consumption. Thus the homogenisation of market generally implicates folklore and local identities, if they inspire the market. The removal of cultural differences first means submission to the global principles of the market, which entail unhindered consumption. It is the condition sine qua non not to question the dominance of the ruling Anglo-American culture.

As an antithesis to the local the global has a global claim. The global is more than the local. Under aspects of behaviour you can see that global information as well as local information demands from users a special cultural disposition. Indeed the global demands a claim independent of the context, but this claim is valid only under the dispositions which are mentioned above. That means there is really no freedom of context but there is a claim which transcends the local dimension and yet is still of local relevance.

using the net by ubiquitous computing means it is possible not only to use local services and local information but also global services and information every time too.

## How much global moments are in the local, how much local moments are in the global?

Let us look more precisely to the global, which is articulated in the local. In general there is a rule that the more a society becomes complex and differentiated in a technological sense, the more information with a global claim plays a central role. A society which is disposed to complex information technologies is more abstract and needs more abstract information. The degree of abstraction in a society is articulated in increasing assimilation in ways of living. On the one hand this is determined by the fact that professional activity is becoming increasingly diverse and on the other hand, it is determined by consumption patterns. Where a

society is disposed to special economic, technological and scientific conditions, its ways of living are assimilated into the categories and values of the dominant market. At the same time the role of local identities is increasingly small. Naturally, the loss of identity depends on social factors. European nobility has always been international in its way of living, the jet set too. Today the loss of identity depends more on professional circumstances. Those who remain nearly exclusively in international spheres like scientists or economic leaders, loses his local identity. An important German manager Thomas Middelhoff articulates this precisely, when he says: "I am an American, who happens to have a German passport." Thus the global is a phenomenon of being oblivious to one's origins and of being economically assimilated into the dominant market. But naturally what is called the global is nearer to some ways of living and cultures than to others.

Let us enquire about the relevance of information for behaviour. Naturally, information can have any relevance for behaviour but only when it has a local connection. Information relevant to behaviour must be motivating under local conditions. That means that information with a global claim has relevance for behaviour when the local sphere is already disposed to global dispositions.

## Are the claims of Ubiquitous Computing really justified?

The question now is, whether in using net information by mobile context-aware systems, the relationship between the local and the global articulates an antagonism, which is held back by the term glocalisation. This question implies another one: Can knowledge, not information, in general be made accessible to the first world by the systems of categorising and evaluating which characterises the dominant market. I believe it is possible to make clear an antagonism between the local and the global by the question of its relevance for behaviour. I will use an example to illustrate. If a European goes through the jungle of Brazil, he may want on his PDA some information on climatic and biological conditions, and naturally, also information on the dangers of this region. The dangers, which are indicated on the PDA would be ones, which have an objective importance for the European, but not for the Native Indian of the jungle. The probability that the Native Indian will be bitten by a big spider is as great as the probability that the European will be run over on a zebra crossing. The objectivity of information is only an objectivity from the point of

view of special dispositions of perception and acting, which are absolute different for a European and a Native Indian. The European acquisition of knowledge is mostly a medial one, disposed to a methodically produced observations; the Native Indian obtains knowledge directly from life and survival. The precise observation of nature from certain behavioural points of views characterises the cultural technique of the Native Indian. And it is not easy to present his knowledge using our symbolic systems. His acquisition of "Lebenswelt" is absolutely different from the acquisition of the European. Would it be possible, by fixing sensors and nanocomputers on the trees and roots, from which I can get local information, filtered by special scientific methods and social conditions? Then I would obtain information on current events in this sphere or on weather changes in a day, but this does not mean that the European would have gained the capacity for context-awareness, which is necessary to survive in the jungle. This information especially cannot be substituted for the adapted sensitivity of the Native Indian. Furthermore it means that the information displayed on my PDA has nothing to do with the Native Indian's understanding of a situation?

Probably the Native Indian's behaviour and actions are not motivated by the information which is so important to me. The Indian is motivated to estimate danger, for example, by the perception of unusual and for us very complex situations. The Indian notices the absence of the chirping of a special bird at a special time in connection with a special smell and a special light and so on. The situations are experienced intuitively and in an instant, and not in an analytic way. At least that based on another disposition of bodily capacities. Thus in specific situations global information obtained by scientific methods can be completely worthless.

The antagonism between the local and the global depends on two factors: first the claim that global information is free from contextual factors, second the assumption that the world can be doubling in a digital way. The last assumption is not possible because only infinite data is available for the digital double and because the historical contingency of the world cannot be doubled. Furthermore, the antagonism based on the assumption that the world is accessible to everyone in the same way. But still the assumption that the internet can give access to the world's knowledge was wrong and is wrong. Information achieves importance only by my ability to attach and connect, which in turn results from my

specific perspective. What is access to a databank for marine biologists good for, if I cannot connect and categorise the information presented? The traditional and historically disposed dimension of access is simply suppressed with the claim that the world of information is accessible to everyone. Freedom of context is possible only by emptiness of contents and that freedom is an expression of special historical and cultural coincidence.

For the idea of glocalisation, the idea that there exist local ways of living disposed to information technology, which do not contradict the global, id est, that it is possible only on the base of an orientation on the principles of an economy and a technological and scientific view on the world. These ways of living will extensively assimilate. Manhattan, Frankfurt, Tokyo, maybe some urban islands inside Nairobi and Calcutta can reach this state but not the whole world. That means the world can reach this state only on condition that all cultures are engaged in the special economic and technologic conditions of the first world's dominant culture. A connection between the local and the global is possible only under these specific cultural conditions.

What localisation is doing, is embedding information in a hierarchy of knowledge for practical life, which is of local importance. First this localisation makes informations relevant for behaviour. Even scientific information which has a global claim becomes important in this localisation. Only information which is important can motivate me to act in my local sphere of realisation and effect. Naturally the dispositions of my "Leib" plays a main role in the relevance of acting.

Another basic problem of ubiquitous computing is the question of how the environment, how what is called the physical outer world can be comprehended in models, in other words, how this outer world can be represented in an appropriate way. Here it is necessary to reject the common idea that the media which are used by people, would reflect the outer world. Such conditions of reflection do not exist in a rigorous sense. Naturally only a finite quantity of data is given from a particular perspective from what we call reality; and only this data is absorbed into models. That means we evaluate what is really relevant in the outer world. In such evaluations cultural dispositions plays a main role. Thus social, psychological and historical episodes are absorbed into the model. The facts are never given pure! We do not all see the same when observing things, except if we agree on a restricted way of reading things. This is exactly what happens

in science, because its objectivity is based on this restricted way of reading. The architect views the house in a different way to the sociologist; the meteorologist the sky in a different way to the artist and the theologian. The world, which is comprehended by science, is presented in an idealistic way, by rejecting the inclusion of aesthetic and psychological moments. But it is not the world of original experience. The representation or simulation is a selection. Some moments are taken to be important for an intention, some moments are taken to be neglectable. But that does not mean that the outer world is purely a construct. Indeed we can strike against the outer physical world. It resists our will to form it. Not only natural laws offer resistance to us, but so too do social, religious and psychological facts.

The idea of ubiquitous computing, to supply the outer world with a memory, with a capacity for communication and perception, does not see the antagonism between the local and the global, if it suppresses its cultural disposition. Here there is no cultural neutrality in technique and no cultural neutrality in using technique. Thus the value of ubiquitous computing systems is not questioned, but rather the claim that the whole world can be transformed into a usable system.

Proceedings of the symposium "Localizing the Internet. Ethical Issues in Intercultural Perspective" sponsored by Volkswagen\*Stiftung\*, 4-6 October 2004, Zentrum für Kunst und Medientechnologie (ZKM, Karlsruhe)