Abstract: Discussing ubiquitous computing, the role of space is not quite clear. To get an understanding of the thinking on space, the main concepts of absolute, relational, and social space are explained. On this basis, the relation of space, technology, surveillance, and behaviour is concluded and exemplified by the results of a research project concerning video surveillance. Finally, it is argued what the consequences of the significance of space are and what in the end is ubiquitous about ubiquitous computing.

1 Space matters

Can we imagine any imagination totally abstracted from any spatial factors? If so, at least it seems to be not that easy. If we think of hell for instance, we probably imagine it as a place quite deep in the underground that one can’t get out. If we think of heaven, it would be a place in the sky, nice and open, but still some kind of space. But what is space? And what can be derived from that meaning in the context of ubiquitous computing and everyday life in public spaces? Thus we might ask, what (the hell) is ubiquitous about ubiquitous computing?

Ubiquitous means everywhere, omnipresent. Therefore ubiquitous computing suggests some technological kind of tracing, some kind of information, surveillance, or control, that can be found everywhere and that maybe ‘captures’ all the space. Despite this fact, the essential factor of space – surprisingly in a sense – does not play a decisive role in the discussions on ubiquitous computing. Maybe just because this is too obvious, the mutual effects of surveillance, technologies and space are not always considered on a sound theoretical and empirical basis. And, as the French writer Pèrec says, there are people with watches everywhere but only very few people with a compass – we don’t ask where we are as we think that we know it (cp. [Sc06], p. 12). Some say, electronic media are eliminating geographical space (cp. [Ka07], p. 101). But on the contrary, space is actually opened up in the first place. So it is more accurately to assume a change of the relation between space and time and of the meaning of space not as a great obstacle anymore. However, space matters not only in everyday life but especially regarding surveillance and control.
2 Containers and Contents

A series of philosophers and physicists analysed space and formed theories on it ([Sc06], pp. 29ff.). The short history of space theories I will draw in the following shows that beginning in ancient Greece the first classics of thinking on space were Plato and Aristotle. The line of thought then continued (and sometimes broke) to thoughts of modern times and to the current theories of space. Still, there have always been different ways to think of it. All in all, there are (at least) three main categories of space theory: container space, relational space, and (more recently) social space. Some eras were dominated by container imaginations of space, some put emphasis on relational concepts.

Plato regarded space as an external, unique factor in his ontology, as some kind of medium holding all mental and material things whereas Aristotle differentiated space and place. A place was in his respect considered as different from its ‘contents’ which were limited and arranged orderly by the spatiality of the place. These foundations of the container-like space were opposed by relational concepts of space that focused mainly on the relation of space, things and the perceiving person. Relational space concepts dominated during the renaissance and were later on represented by Kant, who noted space as some kind of instrument of perception, and by Berkeley who refused to acknowledge any matter existing independently from its perception (“esse est percipi”).

In contrast to relational space theory, Isaac Newton developed the physical theory of absolute space. Space is according to that an infinite homogenous container which is independent from its contents. Absolute space exists as an absolute ontological reality and is different from relative space which is determined only by the relational systems of objects in that space. Thus, absolute space seemingly exists a priori to carry and contain social contents of space ([Sc00], p. 11). But, space constructed like that theoretically factors out the social dimension of space and it is therefore arguable if this concept fits reality of public spaces. Albert Einstein also dealt with that theory but then developed his concept of relational space. In his opinion, space had to be dependent on its contents, meaning a specific relation of the arrangement of space contents among each other and to space itself [ibid.].

Explaining the relation and the reciprocal effects between persons and space (especially regarding everyday life) has obviously to consider both the ‘factors’ of the physical and of the social dimension of space and has therefore to take an integrative stand. Newer concepts of social space (in the broader sense) thus seem to be particularly appropriate and to provide for an integrated view on the interrelations between spatiality and sociality and, as a consequence, on ubiquitous computing. In the 20th century a series of economic and social theories of space have been developed by human geographers, economists, psychologists, and sociologists ([Sc06], pp. 47ff.); ([Lö01], pp. 17ff.). There are concepts of space emphasising physical factors, or rather the influence of humans, social, mental or even discursive dimensions. As these findings cannot all be analysed here, I will point out some aspects which seem to be important in the context of ubiquitous computing and its relation to space and people’s behaviour. Subjective space concepts and theories of ecological psychology are based on the importance of the perception of space of the individual. Space (and place) is an element of the social. Lefebvre’s
assumption that space was always socially “produced” among others led to an understanding of the built environment as an affective, active, and affirmative symbolic core of everyday life (cp. [Ki07], p. 32; [Zu07], p. 114). If space is associated with individual meanings, it becomes a place for someone. Edward Soja sets out the “Trialectics of Being”, consisting of spatiality, historicality, and sociality. Space, time, and social existence itself is thus socially produced and constructed. According to that, the “Trialectics of Spatiality” consists of perceived spatiality, conceived spatiality, and lived spatiality (cp. [Sc00], pp. 16ff.). I consider these elements to provide an informative basis for explaining why and how people interact with spaces and places, and in what ways their behaviour probably depends on spatiality. Against this background, the relation of space, people’s behaviour, and surveillance technology like CCTV gets clearer.

3 The Relation of Space, Technology, Surveillance, and Behaviour: Theoretical and Empirical Findings

Video surveillance usually observes a limited area of space. It is not only the probably most well-known example of surveillance technology but also quite an accurate instrument that brings the relation of space, technology, surveillance, and behaviour to the point. But it would be wrong in some respects to say that video surveillance only observes some limited area of space: firstly, the limitation of space to be monitored is expanded simply by more and better cameras ([Ka07], p. 102). And, what’s more important is that not space is to be monitored in the first place but rather behaviour of people using that space. By running modern surveillance technologies, places can potentially be turned to ‘panoptic containers’ that are used by people only in allowed ways, and if not, ‘wrong’ behaviour can be sanctioned quite fast and effectively. Surveillance technology is designed to guarantee certain social behaviour in certain places and to spot deviances. But as people are people, not everybody is able or willing to follow the often subtle and hidden norms and structures of controlled space. Not everybody behaves ‘mechanically’. People act in a certain manner depending on and interacting with the specific conditions given by a specific place. Space, behaviour and sociality are interrelated and exert modifying influences on each other [ibid.]. There are norms to be controlled which sometimes fit, sometimes conflict with social norms and norms that are specifically embedded into a certain place [Ki07]. As ubiquitous computing itself is part of that interrelation, ubiquitous computing should be focused not merely on controlling norms but should rather be considering the interrelation of space, human behaviour, and the aims of surveillance.

The empirical results of a research project are appropriate to exemplify these assumptions as an analysis of that relation in the practice of everyday routines. Five different public spaces in the city centre of Munich, each specified by distinctive spatial functions, design, and ambiance, were compared in this project [Ki07]. Two of the spaces (the central station and a shopping centre) were privately owned but publicly accessible. The other three spaces were a city square, a park, and a down town shopping street. According to the specific situation of each space (or rather place), people’s behaviour was different. People (unknowingly in most cases) could ‘read’ the subtle norms of the place. The surveillance ‘rate’ (cameras, security service, police, social control, ‘eyes on the
street’ etc.) was specific and different, too. It is no surprise that the effects of surveillance and control differed also correspondingly to its place. In general, there are five groups of people, each with their own attitude towards video surveillance: supporters and opponents of course, and an indifferent neutral group in between. In addition, there are groups that are slightly unconcerned about surveillance and either a little more supportive or opposing. Interesting is the fact that these attitudes are directly correlated to specific places. Therefore ubiquitous computing according to the perception of people using public city spaces is not accepted everywhere nor is it refused everywhere.

4 Consequences and Theses

To draw the consequences for the context of ubiquitous computing, I will point out some of my concluding theses.

Ubiquitous computing is related to space not only because surveillance technologies are designed to observe spaces but in particular because there is an essential interrelation of people’s behaviour, control forms, and space. Surveillance technologies like CCTV try to monitor persons and space whereas people’s behaviour is dependent on specific spaces and on the other hand structures and socially ‘produces’ space. Nevertheless, technological possibilities are increasing in this regard. “Control today is more about scanning data for deviations from simulation models than patrolling territories.” (Bogard at [Zu07], p. 111) It is more and more a total capture of a limited fragment of space. However, research has to be done on an empirical level when regarding these interrelations.

Video surveillance still works best observing a light and limited space with all variables (people!) stable ([Ka07], pp. 103ff.). In this respect, space is (and should be) limited, physical and controllable. Consequently, a concept of container space seems to fit these conditions quite well. But, obviously reality is different. For this reason, I think that surveillance technologies are mainly based on a wrong idea of space. Recent technologies are not limited to filming a frame of space anymore. Yet they are aiming at capturing social behaviour, e.g. by predicting (deviant) behaviour by corresponding software programmes or by implementing recognition technologies based on biometric data. Nevertheless, particularly these efforts are the prime example for my assumption that there is an arguable space concept for surveillance: these newer methods, trying to analyse a social dimension of the observed space, are even more depending on container conditions. The more variable the situation is, the broader is the margin of error. Secondly, these methods are still scaling (!) their object by spatial-physical, and not social or psychological information – a face, the way somebody walks, where somebody stands and how long…all in all controlling container spaces that in fact are social spaces.

The advantages of the concepts of social space should therefore be given thought to. One might ask now, what would be the proper space concept? We wouldn’t really have to raise that question if it was already answered with satisfying results. Therefore, I also have to state, I don’t know. Still, it should be a concept considering the relation of space, technology, surveillance, and behaviour in an integrative way and from people’s per-
spective rather than from what’s technologically possible and what’s not. Especially regarding ubiquitous computing the concept of container space has to be broadened and enriched by various psychological and social factors.

For video surveillance it can be said that the direct effects on everyday life in public spaces are moderate and should not be overstated in one way or the other. Direct effects on behaviour are triggered more effectively firstly by real (not ‘virtual’) control that can immediately be followed by sanctions and secondly by geographically relevant excluding—including processes. Paradoxically at first sight, the spatial expansion of surveillance and computing ‘displaces’ the topic from the awareness of many people: like many other technological evolutions, one might simply gets used to it. Though, it reflects not only unconcern of the users of public spaces but resignation and powerlessness. It can be argued if video surveillance is for good or for worse and there are various effects on society in general [HM05], but it is always something that has been imposed on everybody using the space under surveillance ([Kl07], p. 164).

What is in the end ubiquitous about ubiquitous computing? In my opinion, there are four main aspects. First, the controller doesn’t need to be on-site as the space under surveillance can technologically be ‘brought’ to the place of the controller. Thus, the act of surveillance itself gets increasingly independent from a particular space/place. Secondly, improving technologies offer the possibility of expanding surveillance of spaces in a qualitative sense, and, of course (thirdly) in a quantitative sense. Surveillance technology can be implemented almost everywhere, controlled spaces are expanding. Finally, not only ‘intelligent’ software but rather crosslinking of different technologies, data sources and surveillance instruments might above all push the limits of the ubiquity of ubiquitous computing.

References


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