Unconscious Perception in a Responsive Architectural Environment

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ABSTRACT

The language of architecture has evolved with human culture and has built a repertoire of forms and topoi that we take for granted without being forced to constantly reflect about the meanings of these forms. We perceive and orient ourselves in the built environment without interpreting every form or space separately. However, this is not usually the case in the architecture of change. In such responsive environments, the changes are often so omnipresent and explicit that the interactor's attention is fixed during these changes. There might be situations in which demanding full attention while the environment changes is necessary. But as a general rule, such an approach cannot serve as a model for future architecture. This is because, if all technology, flexible architecture included, is to compete for the attention of the user, the consequence will be a dissonance and overload of signals and events – a scenario which the user would try to avoid or ignore altogether. One approach by which responsive architecture may become a part of our lives as static architecture has is to adapt it in such a way that only our peripheral awareness is stimulated. But for this architecture to function properly, it needs to communicate with its users. Can this be achieved without demanding the full attention of the user? What could be the strategies for such architecture to inform the users unconsciously and to obtain the input necessary to perform properly? Is such architecture still deterministic, or would this kind of interpretational architecture lead to non-determinism and the emancipation of the user from the will of the architect?

Keywords

affect, affordance, communication, determinism, interactive architecture, periphery, user perception, unconscious

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1. INTRORDUCTION

Responsive architecture is concerned with research into an architecture that adjusts and adapts to the demands of personal, social and environmental changes. Also called interactive architecture, it is usually realised as a combination of kinetics and embedded computation. This term is used generally for architecture that changes in both a structural (walls, shades, surfaces, etc.) and an atmospheric (temperature, lighting, sound, etc.) sense. The terms interactive architecture and responsive architecture are used interchangeably in this paper, as some other authors do (e.g., [8]. For certain authors, though, responsive architecture is a sub-category of interactive architecture, that is built into the structure of the building to respond to the changes of the natural elements, such as sunshine, winds but also such complex and unpredictable forces as earthquakes [4]. There is also a differentiation in the grade of sophistication of the system, as in Usman Haque's description of interactive architecture [7], which narrows the term down to systems that use circular interaction or multi-loop interaction (systems with adaptable programs, such as heating that adjusts to users' working hours and weekend leisure habits), in contrast to merely reactive systems (lights switching on when daylight fades or shades coming down when the sun comes out). It is difficult to imagine a world in which interactive architecture would be a part of our everyday life and surroundings if it had to be realised with the majority of projects and experiments found in interactive architecture today. As most of these projects are designed to attract the user's attention to obtain some sort of feedback and so be able to act, the multiplication of such a strategy would be a cacophony of signals and events which would provoke an adverse reaction from the user. The user of such an environment would either become totally unresponsive to such signals or, in the worst case, would be scared away completely. Marc Weiser, who coined the term ubiquitous computing, has already made it clear that omnipresent technology will only be accepted if it is perceived as a calm technology [12]. And Malcolm McCullough states that 'the problem for all design disciplines is: the foreground [of user attention] is full' [9, p. 49]. The problem for interactive architecture, as for interactive technology in general, is how to communicate with the user without demanding too much attention. A further issue with interactive architecture is how much freedom it provides for the user. One would think that the greatest asset of interactive architecture is that it provides more options and freedom for the user. Instead, in reality users receive totally controlled spaces and movements – a misinterpretation of

the term flexibility, as I have mentioned in earlier papers [3]. The conflict arises early, during the deterministic position of architects in the design process and their perception of the user and the user's role in the spaces to be. How, then, can designers approach the creation of spaces that do not reduce but instead open new options for users?

2. PERIPHERY

As a possible answer to the problem of omnipresent technology, in their essay on calm technology Weiser and Brown describe [12] the idea of periphery. Periphery is defined as something in the 'background that is outside the focal attention, but which can quickly be given attention when necessary' [12, p. 79]. Calm technology engages both centre and periphery of attention and would alternate between the both:

> "Our notion of technology in the periphery is related to the notion of affordances. An affordance is a relationship between an object in the world and the intentions, perceptions, and capabilities of a person. "
> [12, p. 80]

In this scenario, the users perceive the interactive elements when they need them, just as computer users turn their attention to printers only when they need them.

3. AFFORDANCES

Central to the approach of periphery is, as mentioned in the quote above, the idea of affordance, a term which received widespread attention with the publication of 'Theory of Affordances' by James Gibson [5]. For Gibson, affordances are 'all "action possibilities" latent in the environment, objectively measurable and independent of the individual's ability to recognize them, but always in relation to the actor and therefore dependent on their capabilities.' The concept was further expanded by Donald Norman, for whom the perception of the possible actions was not only defined by the physical capabilities of the actor but also by the actor's goals, plans, values, beliefs and past experiences. In changing environments, such as interactive architecture, this kind of understanding of affordances implies that the signals coming from an environment may be, but need not necessarily be, perceived by the user. Furthermore, the perception of the signals is not only dependant on which individual feels addressed by them, but also on the current situation the user is in, providing a highly subjective approach to communication. This choice between possibility of interpretation and non-awareness of the user is a basic factor responsible for the loss of control over the user or the non-determinism over the user. What is important to note is the subjectivity of the interpretation by the user, meaning that there is neither a single solution nor a single approach of how the signals can be perceived. There are several consequences of looking at interaction design through the lens of affordances. One is that the designer, to address the affordances of different users, needs to consider several different, perhaps even conflicting, approaches to making a statement that can be perceived. This leads to open-ended systems that not only offer multiple solutions but would also adapt to states that might not have been envisaged beforehand, thus including the unpredictable. Another interpretation is that affordances designed by one designer can only be perceived if the users adapt to or resonate with the views of the designer, as in the deterministic world defined by designers today.

4. COMMUNICATION IN THE PERIPHERY

But how can this low-profile communication with the periphery be realised without demanding the focus of attention so as to obtain feedback? This question is made more pertinent by the fact that design in general has concentrated on the visual aspect of communication with the user, which is usually deliberate and tries to attract attention in its mode of communicating. This involves a conscious act of the user. In our everyday actions, we rarely reflect consciously on every piece of information around us. Yet the environment can change around us without overloading our senses, attracting our attention only when necessary. For instance, when we drive a car the environment changes all the time. While driving, we can absorb huge amounts of external information quickly and at the same time we are capable of focussing only on the information of interest or even become lost in our thoughts without consciously concentrating on every detail around us. In a way, there are parallels to speed-reading. The realisation that we read primarily with the mind and not with the eyes leads to approaches to reading that try to reduce distraction and maximise the amount of information absorbed, allowing an increase in reading speeds [2]. We normally do the same when moving through everyday architecture. We advance through a habitual environment without constantly reflecting on how we interpret the language and signs of architecture, only taking notice of details that are new or unusual. These details are then left aside when they seem unimportant. As Walter Benjamin put it: 'Architecture has always represented the prototype of a work of art the reception of which is consummated by a collectivity in a state of distraction' [1, p. 232]. In a new environment, our senses are alert and observant, simultaneously creating a first impression or model of the surroundings that we keep in our mind at the same time as we move through it.

> "Apparently humans assimilate their surroundings by means of mentally constructed representations of spatial relationships. Formerly, researchers held that such environmental schemas are purely mental, but now there is a greater recognition of direct engagement and peripheral awareness as complements to deliberative mental models."
> [9, p. 33]

As mentioned at the beginning of this section, architecture concentrates on visual effects to stir us. Yet the other sensory systems also make a contribution; Gibson describes them as the auditory, taste-smell, basic-orienting and haptic systems, and they all add up to the sensations of a place that we register. The interesting part is that the non-visual senses tend to address us unconsciously. These impressions nonetheless become part of the constructed representations of spatial relationship and add, if nothing else, an emotional element to the impressions of the place. The non-visual senses, and to some extent the peripheral vision, have a direct line to our unconscious perception. Often, the only reaction to our presence in space coming from the environment is registered through our non-visual senses, such as the echo of

steps in a room, the elasticity of the material under our feet, the cold of the shadow or the warmth of the sun on our skin, etc. I believe designing technology to communicate with the users in interactive architecture without demanding their attention needs generally to be done in a way that can be perceived with the non-visual senses. Subtle changes or communication from the environment when perceived through non-visual senses would not demand unnecessary attention from the user, provoking unconscious reactions when necessary. The entire communication between the user and the system would take place unconsciously for the user. To design interactive architecture for unconscious perception would of course be a difficult task, especially because of the lack of experience of non-visual effects in architecture. One strategy may be to use the more general and inaccurate concept of affect. Affect is excluded from the archetype of representation used so much in the visual realm. According to Sara Ahmed [6], affect could influence us to move towards or away from objects. She calls things to which we gravitate or are attracted a 'horizon of likes' and things that repel us or push us away as 'awayness'. As elusive as this strategy might seem, it is constantly used in traditional architecture. Frank Gehry uses what he terms 'handrails', elements that allow the users of his buildings 'to orient themselves with respect to calming, exterior views or stabilizing points of reference' [11, p. 128]. He uses also elements of surprise to excite and inspire, but does this in counterbalance with familiar features to reassure his users. Another institution that plays on many aspects of perception and behaviour is the Disney theme parks. On one hand, they use traditional elements of amusement parks to immerge visitors in the fantasy world of their different rides, such as shutting out daylight (removing visual cues) and using artificial lights, sounds and smells to create effects and not least drops and sharp changes of direction during the drives to create sensations. On the other hand, they manage to create specific atmospheres in their park themes (or at least they try), using 'cross-dissolves' to regulate the gradual and (nearly) seamless changes between the areas and different types of attractors, such as 'winies', landmarks that stand out and attract people to move to certain points of the park. 'Cross-dissolve' is achieved through gradually adding signals perceived though all the senses and preparing the visitors for a new scenery, while at the same time the signs of the old scenery slowly fade away [11, p. 135]. At the same time, the effect of these 'cross-dissolve' elements is somewhat constrained, as they have to compete with the 'winies' that are omnipresent as orientation landmarks. The atmospheres are finely tuned, not only visually through the architecture of the buildings and the landscape but also with background music and noises, smells of different typical cuisines and kiosks selling sweets or pastry, down to the uniforms of the employees matching the scenery. The manipulation of our moods through unconscious perception is currently a hot topic in the commercial world too. Elevator music that is slow and relaxing has been found to make visitors slow down and browse longer in shops, while inducing specific fragrances in the fruit and vegetable areas of grocery stores has been found to make people believe they are buying fresh and healthy food. The Mosquito, an 'ultra-sonic teenage deterrent system' [13], which is intended to deter teenagers from an area by emitting an unpleasant sound only perceptible by non-adults (ca. under 25 years of age) can be seen as a repelling element aimed at a specific community. The commercial world has been found to employ different measures through mass media to influence the public unconsciously about its products, applying such methods as subliminal messages interwoven into films, commercials and audios, which are banned by law in some countries, or product placements in films and pictures, which has become quite conventional. One recent change in approach by the commercial world is that with new technologies it can target customers locally and act selectively on specific customer groups. With current tracking and identification technologies (id cards, mobile phones, etc.) customers can be addressed directly according to their known habits and preferences in the way that Google ads and Amazon book suggestions work. Until now, the interactive technologies introduced in the commercial world have only had a reactive character, i.e., the signals produced are only sent as a reaction to the presence of customers and have not yet begun communicating with them. Yet the examples mentioned also exhibit the hazards of the unconscious that can be introduced with interactive technology. It is clear that the technology must be transparent for it to be accepted, and the user has to have knowledge of its existence and approve its use. One of the more sophisticated academic examples is the 'adaptive house' [10], which learns automatically from the habits of each separate user so as to predict the actions and desires of users in advance and act appropriately. The 'adaptive house' is an example in which the system analyses the correlation between household activity and user reactions. The house has a neural network, which learns over time how the user wants it to react to specific conditions. Not only do the user and the system interact with each other; they actually adapt to each other as specific habits emerge over time. So, for instance, the system learns when the occupants are usually out of the house for work or when they go to sleep, so as to turn down the heating in the idle time and turn it up early enough to have an ideal temperature before the house is used, thus contributing to substantial cost reductions.

5. CONCLUSION

In this paper I have tried to address the topic of communication between interactive architecture and its actors. An environment where most of the technology is constantly competing for a user's attention is undesirable and would lead to dissonance and overload of signals and events. At the same time, the technology has to communicate with the user in some way to learn how it should respond. Different solutions allow the direct and conscious control of the systems involved. But, as I have suggested in this paper, the future design of interactive architecture should focus predominantly on indirect and unconscious communication between the user and the interactive system. Such systems would adapt to user habits and needs, by analysing either the mere presence or the actions of the user in the interactive environment. At the same time, the systems would communicate with the users on an unconscious low-key level, probably addressing the non-visual sensory systems. The users might react, depending on their affordances, either directly through commands or unconsciously, for example by changing their position. Tools are meant to extend the capabilities of humans. But ever since the industrial revolution, cases have also been observed in which users serve the technology for the sake of using technology instead of the other way

around. Factory assembly lines and smart-phone addictiveness can be seen as examples of how technology can dominate humans, and one should reflect why. As mentioned in this paper, there is a reasonable risk of unconscious communication being abused to control users. At the same time, it has the potential of creating a space that empowers the users to do much more with their environment. In either case, a discussion of the merits and the perils of such an approach is surely worthwhile.

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