PING GENIUS LOCI
interfacing architecture for a networked society

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Abstract
In this paper i will present our current research in progress where we try to integrate some new prototypical functions for the networked society into spatial, natural, architectural context. The research connects models and technologies from a set of fields including human computer interaction, computer games, physical computing, spatial design and architecture. Part of the work is based on architecture prototyping, built and functioning installations where the user experiences can be tested on a 1 to 1 scale.

Ping Genius Loci (addressing the spirit of the place, 2005-2006, Aether Architecture) is the latest of these architecture prototypes, built up from 400 radio networked, solar powered, self sustainable intelligent analogue pixels, that are placed on a 20 by 20 meters grid. These pixels function in the bright sunshine, where the experience of digital media usually doesn't exist. There are a number of interaction possibilities under development but most interesting based on the thoughts above is the interfacing of people walking in the grid.

Another angle is shown in the "Low tech sensors and actuators" (Haque-Somlai-Fischer, 2005) research, where instead of designing intelligent spaces, we map out simple building blocks for alternative interfaces, and create a user guide, so a more participatory scenario can be tested.

Keywords
Human Computer Interaction
Interactive Architecture
Low tech
Natural Interaction

01 INTRODUCTION
In this paper i will present our current research in progress where we try to integrate some new prototypical functions for the networked society into spatial, natural, architectural context. The research connects models and technologies from a set of fields including human computer interaction, computer games, physical computing, spatial design and architecture. Part of the work is based on architecture prototyping, built and functioning installations where the user experiences can be tested on a 1 to 1 scale.

02 SOCIAL CHANGE
Most technological innovations, that have paved the way for new kinds of communication, have resulted in explosion-like social changes. Dating from the invention of printing, that resulted in the emergence of nation states(McLuhan, 1962), to the highly researched contemporary advance of networks that pervade our social

spaces, our thinking and our environment. One of the most direct change of use can be experienced in situations where the networked public struggles against the hierarchical authorities, 'smart mobs' (Rheingold, 2002) having a real time feedback system using text messages have been party responsible to oust President Joseph Estrada in the Philippines, bring down the former Spanish government after the Madrid bombings, and as many indication show at the 2005 civil unrest in France, youth have been heavily using text messages, blogs and email to act against the police (Wikipedia, 2005)

The interaction between the individual and the communities has undergone major transformations, so have the uses and functions we wish for in our daily interaction with our environment, with our cities.

One way to interpret this would be to say, that the medium of architecture is changing, the substance that used to shelter, than to communicate cultural identity, could easy disperse to communicate among all of us participating in the society, open up its domain so it can be created through use (Haque, 2002), for the networks of our dissolved identities.

Figure 01: Teenagers bringing their computers to a hall to live social life(Source scene.org)

Figure 02: Polish block housing memorial for the Pope, by tenants switching their light on or off (Source: http://ds5.agh.edu.pl/~grzanka/krzyze)

03 SPACE AS AN INTERFACE

If we presume that the medium of architecture is taking roles for communication, we should look at models for communication that could work for spaces, as well to map out the technologies that could allow this new functionality. A major change, as we will see, is that the designer has to consider form(modality) – functionality(interaction) – content(message) as a triad for mediated architecture. The form of communication, the language of interaction, and content, whether prescribed by the designer or not, should all be understood a little better.

The form of communication, or the modalities are just as important factors as they where in previous modes of communication. Referring to Marshall McLuhan's(1964) ideas on how the medium alters or replaces the message, or Michel Serres (1982) describing that the carrier of information is never neutral, communication is not theoretical, so all communication should be modelled as there would be a third person, a Demon, a prosopopeia of noise.

> *When I draw a square and a diagonal in the sand, I do not in any way want to speak of this wavering, irregular and inexact graph; I evoke by it the ideal form of the diagonal and the square. I eliminate the empirical, I dematerialize reasoning. (Serres, M, Hermes, The Platonic Dialogue)*

Noise is a necessary participant in Serres' model of communication (also as he argues later), and as we could speak of materializing the Demon above, we might believe that architecture provides a promising medium as Noise, adding atmosphere, scale, accident, and localized qualities to communication.

But if we are supposed to build spaces with interaction and content, whether machinic or mediated - cultural, we need a language to communicate with them. Therefore it

should be interesting to have a look at some interface research concepts.

Modalities of human computer interaction
Looking and current developments in HCI research from the user experience point of view, we can pinpoint three distinct approaches.

- The universal interface, a standardized gadget to surf the ubiquitous networks
- Natural interaction, to interface the "knowledge at hand"
- Virtuoso techniques for highly complex tasks

The first approach seems to be the major trend, (due to the ease of creating emotional links to such devices). A digital swiss army knife - tamagotchi, where the user gets a digital companion to explore the vast fields of data wherever he/she goes.

The second shows a will to interface natural communication languages of our culture, interfacing gesture, mood, behavior, in its most natural form, for an ever changing task. This will not converge into a standardised interaction language, as each task requires and allows its own set of simple and natural HCI gestures, however this can become a link to architectural space, where existing uses, such as walking in a space offer a great variety of codes for communication.

The third set is used in situations where simplification is not possible, complex task where the human learns to speak the language of the machine.

Understanding the characteristics of these modalities, it seems that in the regard of spaces and cities, we should focus on natural interaction and use the space as an interface, as well as finding aspects of the architectural experience that could become programmable, so space can participate in the described communication.

04 INDUCTION HOUSE SERIES

Aether Induction House(2003-2006 Aether Architecture) is a design research project, that aims to allow the medium of architecture to participate in this network, to allow to be addressed, to open it up for the large number of communal interaction possibilities. Like communication technologies use media that are energy efficient to carry information, we research phenomena with low inertia, that is perceivable parts of our reality that do not take too much energy to be altered, and so, to be informed with change.

The project also takes physical presence as an important factor, as our built reality does have a strong reassuring identity against the flow of change. To combine this two, quite different qualities has been the focus of these explorations.

Malleable Structure
Many interaction designers or researchers develop a very interesting interaction model, than apply it on a very generic form (screen, interface, furniture), not to take attention away from the interaction. We have tested developing new structures that carry digital information as low as in materiality or structural qualities in some of the installations. Although they were hard to read as information, we did manage to create unique hybrids.

Low Tech

Example: In the first two versions we used our own non-efficient technology, the Morse-mouse. Due to our limitations in programming and hardware skills, we use Flash as a projection engine, and to interface this program to sensors, we use a computer mouse, and a small device that is clicking Morse code messages on the Mouse button, where flash is listening to those. A human protocol on a human interface. Low tech and DIY technologies as a strategy can allow architectural scale visions, at least for a transitory state. It started out as a necessity and became a choice for our technologies. Trough constant re-appropriation of existing technologies we create new interfaces that hold connotations towards their original use, so stay familiar, but misplaced in a new context.
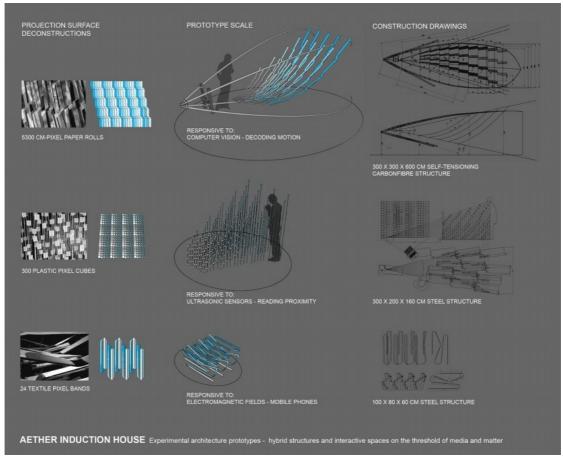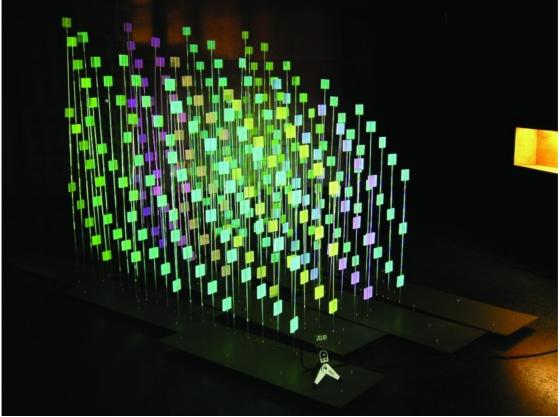

Figure 04: Induction house V1 – V4

Figure 05: Photograph of Induction house V2: Distributed projection structure
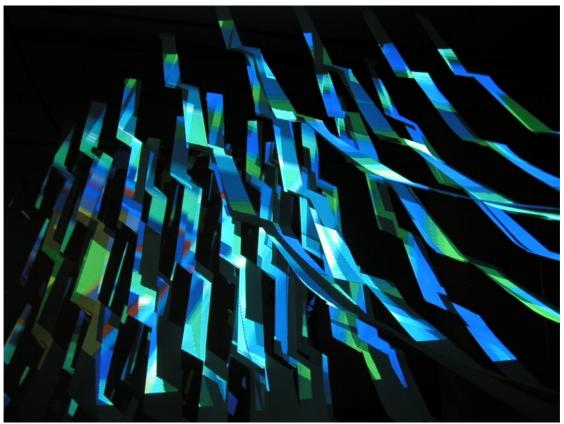

Figure 06: Photograph of Induction house V3

05 INDUCTION HOUSE V4: PING GENIUS LOCI (PGL)

Having researched a set of techniques to build spatially programmable structures, we needed a focus on the possibilities of new uses, as described in the introduction, also we wanted to depart form the dark-room domain of visual media experiences.

PGL(2005-2006 Aether Architecture) is built up from 400 radio networked, solar powered, self sustainable intelligent analogue pixels, that are placed on a 20 by 20 meters grid. These pixels function in the bright sunshine, where the experience of digital media usually doesn't exist. There are a number of interaction possibilities under development but most interesting based on the thoughts above is the interfacing of people walking in the grid. We had our first test showing in 2005 December, where we evaluated scale, different spatial setups and simple interaction models.

Open design archives

The project has an online database of its development and technologies, with the goal to open up both its final form and its process, the 'code of design' to anyone interested, to seek possible collaborations. This site can be found at www.aether.hu/2005/v4

Open content

Like some similar large scale urban screen projects, we are working on scenarios how to open up the 'content' of this installation. One promising alternative is to interface our technology to processing, an easy to use and free programming environment, and use electronic art festivals to create workshops where participants could write interaction scenarios themselves.

Figure 07: Test showing of 200 pixels
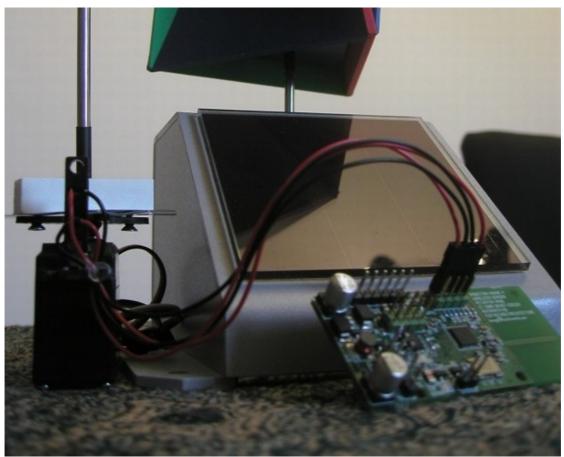
Figure 08: a ball displayed

Figure 09: The technology within

This installation explores scales that can be reasonably designed and built with embedded sensors, communication, to create programmable sites for natural interaction in public spaces. However, if we are to go forward form here in scale, we should borrow from technology developer cultures again, and see if we can create participatory technologies, so the cities can be equipped with alternative interfaces by the people themselves. The last part of this paper opens into this direction.

05 TO GAIN YOUR FREEDOM ,
BUILD YOUR OWN INTERFACES

Technological literacy

In today's ubiquitous computing environments, smart homes, the general approach seems to be to hide technology as much as possible, make it invisible and so advanced, that the user has no choice but to follow the rules set out by the designers. The user has to become a dumb consumer of this communication.

Therefore we might want to look at alternatives, where such technologies are not mystified and out of reach, but become part of the open cultural production, very much like online publishing allowed public participation to decentralise knowledge. Technological illiteracy could be just as devastating in the coming century for the individual as illiteracy would be today. (Munro, A J., 2005)

Low tech sensors and actuators

In collaboration with Usman Haque, we have developed a suite of low-tech sensors and actuators using electronic children's toys and gadgets that can be hacked for their constituent parts. In this way, artists and architects can quickly and cheaply develop interactive spaces and objects. The outcome of the project was an instruction manual of sorts, a manifesto for low-tech, a conceptual framework for complex interactive systems. IR toys as proximity sensors, cats as interfaces, torches as power sources, walkie talkies as wireless networks.

There are two other possibilities deriving from this research. On one hand, larger scale architectural experiences could easily be imagined with participatory approaches, as one of the major setbacks of technological spaces, the problem of maintenance could be dissolved; on the other hand, possibilities of using such building blocks to create simple computers running complex programs.
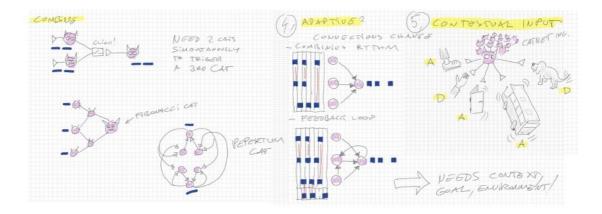

Figure 11: Possibilities of further complexity

Figure 10: A simple sensor

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LINKS

aether architecture:	www.aether.hu
Ping Genius Loci:	www.aether.hu/2005/v4
Induction house series:	www.aether.hu/inductionhouse
Low Tech Sensors and Actuators:	www.lowtech.propositions.org.uk

07 ABOUT THE AUTHOR

Adam Somlai-Fischer (Szabolcs, 1976 Budapest) trained as an architect, became interested in how communication technologies have altered social spaces, and what new possibilities they can provide for architecture. His thesis, Mediated Spaces(2002), looking into how new technologies of connectivity have altered architecture, has received international publicity. He works as an architecture and interaction researcher, he is a founding partner of Aether Architecture, creating interactive architectural projects. Aether's work has been exhibited both at ISEA 2004 in Helsinki and at the Venice Biennale of Architecture, and published in design magazines from the UK to India.

Graduated from the Architecture + Urban Research Laboratory, KTH, Stockholm, Adam has been teaching at the Architecture and Media technology departments at KTH, working as a guest researcher at the Smart Studio, Interactive Institute in Stockholm, and at the Media Research Centre at the Department of Sociology and Communications, BUTE, Budapest.