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PERCEPTIVE VIEW

HOW LIGHT MESSAGES SHARE PERCEPTIONS OF A REMOTE ATMOSPHERE

Richard Appleby, Kees (C.J.) Overbeeke,
Designing Quality in Interaction group, Department of Industrial Design, Eindhoven University of Technology. Den Dolech 2, 5612 AZ Eindhoven, the Netherlands.
+31402475966, r.s.appleby@tue.nl

ABSTRACT

In this paper, we explore the possible ways to communicate a 'point of view'. We discuss how images can be abstracted to form impressionable ways of communicating a remote context and how this can contribute to people's perception and appreciation of remote atmospheres. Through increasing speed and complexity of communication services, functional and practical values have often precluded more sensorial and ambient experiences that support relationships over distance. Here we consider how the use of peripheral visual information from one place can be portrayed within a remote situation as an abstract visual experience, to share the sensations and feeling of that remote place.

Keywords: Light, point-of-viewism, design, perception spaces, reflection planes,

1 INTRODUCTION

Which artefacts around us will remain intact and valued during the emergence of more intelligent environments? How will their product functionalities be adjusted or interpreted? What is their significance and how do their values and tangible qualities contribute to our experience, in a meaningful way? The point here is that it is not the function of the objects and the environment we should consider, but rather the nature of our own behavior and wishes and then, how this more naturally affords greater sensitivity and responses from our relational field and the material definition around us.

As Jean Baudrillard [4] states *" The 'atmospheric' interior is designed to permit the same alternation between warmth and non-warmth, between intimacy and distance, to operate not only between the objects that comprise it but also between the human beings that live in it.'*

How can we express these impressions of a place in a way that explains our senses and feelings? Over the telephone, we can describe what we see and experience, but then this is second hand to the recipient: it is hard to perceive and experience aspects of the environment without moving and behaving within it ourselves.

From the Philips 'Light atmospheres project' ambient lifestyle 2006,[3] there was a desire to explore user interfaces that provided opportunity for more selective interaction with light. These were constructed within the simulated domestic environment of the 'Experience-Lab'. The lighting effects were structured as changing the surfaces of furniture, walls, etc as coloured settings to evoke different moods. One of the main questions in conclusion was *"how to enable users to create their own presets?"* Whilst the user was able to control the colour and intensity of light to suit their mood and emotions at the time, the system still relied upon the input provided by the user interface to form the selected lighting settings. In order to enable atmospheres that form their lighting surfaces in a more intuitive way and in relation to our moods and emotions, then such systems need ways to sense and appreciate these different attitudes.

This is similar to many consumer products that have physical components with fixed definitive functions, which operate without any reference to human presence or any other feedback from the environment. Research into how our moods and feelings are influenced by our immediate surroundings, clearly indicates the relevance of future systems that are designed to embrace more adaptive technologies. These can now support a more relational interaction sequence between people and their spatial surroundings and feel much more intuitive to experience. The services and values offered will be designed through different forms of mediation that resonate more with our intuitive feelings and emotions. Intelligent technologies that can measure and assimilate our emotional state, will then be able to attune their content and more sensitively contribute to the lighting experience.

Our emotions are formed through the way we look at the world, how we appreciate and interpret different phenomena. Through our day to day observations and experiences we shape our knowledge, skills and attitudinal responses with feelings that form our value system. These sensations and influences stimulate our opinions and ideas, providing substance to our point of view and to how we choose to communicate with each other. But then, there are certain boundaries to our sensations, the speed of our visual senses has considerable impact on both cognitive and intuitive processes during the assimilation of our surrounding environment. Vision provides us with the ability to select and make choices, to clarify and to illustrate our viewpoint.

Time is also an essential factor that supports our real experience and sense of place. The desire to feel attached and part of the moment when it is happening, is different to the past record of photographs and videos and different again to the imaginary future, which is beyond our real sensations. David Abram [2] writes a poignant description of the experience of being 'present'. . . *"from this closer vantage I see, too, that the shadows on the boulder are not really shadows at all, but patches of lichen spreading outward from various points on the rock surface, in diverse textures and hues- dull blacks and crinkly greys and powdery, deep reds- as though through them the rock was expressing it's inner moods". . . . ." Things are different in this world without "the past" and "the future" my body quivering in this space like an animal. I know well that, in some time out of this time, I must return to my house and books."*

Merleau Ponty [5] describes the importance of our intuitive vision, rather than relying on what we think we know and expect: "*The bounds of the visual field are not themselves variable, and there is a moment when the approaching object begins absolutely to be seen, but we do not 'notice' it. But the notion of attention, as we shall show more fully, is supported by no evidence provided by consciousness. It is no more than an auxiliary hypothesis, evolved to save the prejudice in favour of an objective world. It is in this atmosphere that quality arises."*

Within an earlier paper 'tangible light interaction' [1] we reviewed how light becomes tangible at the point where the illuminated materials and surfaces become attractive. This is very much a visual sensation created through intuitive interaction with the surrounding objects and environment. It is within this atmosphere that our actions and movements harmonize and flow with our feelings and emotions. Within the same notion, things that are perceived to be discordant or invisible are not attractive, but may be curious – and will evoke different sensations.

Any particular form will change it's reflective surface according to it's surrounding 'ambient illumination' and theoretically, with intelligent materials that can modify their reflective surfaces, the way in which the form is seen and sensed (perceived) can become more or less attractive. Wherever light becomes more or less tangible, the quality of visual sensing and attraction is always embodied within the material surface.

2 DESIGN PROJECTS

Design projects were set up to explore how our perceptions of everyday contexts can be reviewed as a similar experience, but within a remote field or dimension. Typically, when two people communicate from different locations, each has to imagine the contextual information to help secure their senses and feelings. These provide the visual boundaries for the communication – the conversation space. However, each person has to rely either on previous experiences, which may be quite historic, imprecise or with different weather conditions, or they have to build their visual understanding from a verbal description that is again is second hand. The Messenger lighting project is a system that communicates visual information between remote contexts to allow people to share the same feelings more directly. Even though this remote communication is abstract from the physical context in which it is created, with a technological system using 'real time' communication, the intelligent systems can reproduce the tangible lighting effects in another distant place, to evoke similar feelings of visual attraction. Screen based video cannot do this since it restricts the point of view to a flat plane.

Appleby and Overbeeke [1] noted that, *"Now we can design specific 'cues and responses' which are more closely related to our human interaction at that moment, rather than design values that are centred around the object's construction.* (. . .) *.If we are concerned with physical elements and a physical space where we are designing for adaptive changes which happen frequently, then materials and dimensions used for designing and creating these environments need to maintain a simple* *geometric framework or 'design system' which can then contain interactive zones (functions and media) which may be highly complex.''*

2.1 The Prototypes

The design project was set up to establish a system that has an aesthetic balance that can be experienced in a remote context, with interaction between physical form, the observer and the surrounding atmosphere. The individual form elements and reflecting planes were designed with simple geometries and form elements that focus the user's attraction to the remote scenario. The physical nature of the project environment had to include the system architecture that receives the live media, and then form the interactive experience with the user.

There are two parts to the prototype which was originally envisaged as a centrally based, mediating system. Firstly, the *'Reflection Planes'* as areas of attraction and awareness, were realized as integrated LED systems within certain geometric structures. This is a more peripheral field, as a reflective and passive experience. The *'Lens Explorer'* can then play a more active role in adapting and editing the data. Through curiosity, the onlooker becomes more essentially involved in the event as it happens. *Reflection planes* were proposed to announce separated visual elements where collectively they provide an impression and awareness of the remote context. The aesthetics of interaction of both parts of the system, contribute to the presence and emotions of the observer.

At Eindhoven University, Masters students Bram Knaapen[6] and Ivo Stuyfzand[7] formed the project team. Design of the reflection planes developed in several stages. One of the first questions was to do with establishing the correct position of the environment recording device. Essentially this needed some form of wearable web-cam, that can transmit the images through wireless connection. The difficulty here is that the reality of any viewed image or panorama depends largely on seeing from a human point of view, so that the observer in the remote context has the impression that they are in fact seeing the surrounding environment realistically and from a position that would normally be their own viewpoint. Initially a web-cam was provided with two axis of adjustment with two variable resistors to derive the orientation of the camera position. By keeping the resistors still whilst the camera is moving, the computer can calculate the changing direction of the camera. The computer can then manipulate the projected images in the remote context at the right height and position, to simulate the viewpoint of the web-cam. This set-up was capable of providing a series of images as a 360 degree panorama, and as the person and web-cam moved, the different layout of projected images showed the difference between the current and previous viewing positions.

Figure 1. Web-cam with variable resistors tracks the camera orientation, where multiple images indicate how the viewing position changes.

2.2 Reflection Planes

The level of abstraction became an important aspect of this re-viewing scenario, where it is apparent that in many situations, only small parts of the image are necessary to provide the right cues. Such as seeing moving car headlights at night, where the movement of these lights is significant to the place they come from. Thus they provide information both about the type of vehicle and the vehicle's context. It is then possible to reduce the visual experience to certain significant aspects and portray

these within a geometric design system. The abstractions become a clear reference of the actual events in the remote context, and can be easily recognized.
Hence the next prototype explored to what extent small illuminated areas of the picture from the remote location, could provide sufficient cues to perceive the atmosphere and activities from that remote place, without needing to see the full moving image. This was done by arranging 12 RGB/LED beacons across a wall, interfaced through a Phidget board to a computer that received the content from a remote source. So that by using software sampling from certain points on the remote location movie, these points could then be mapped to the RGB LED beacons which illuminated at the same colour intensity and frequency as that designated point of the movie. As a simple test to gain qualitative feedback, participants were asked in discussion what they observed within the lighting beacons. Simple contextual differences were clearly seen such as the difference between blue sky and the ground, the moon, trees and other basic environmental features.[Figure 2]

Figure 2. Sample points from remote location mapped to 'light beacons'

A third prototype of reflection planes was constructed with a simple geometric design system of LED lights. A remote user captures contextual images from their immediate surroundings, where the images are analyzed and filtered as an abstraction. These are transmitted and then mapped to the designed LED system. Selected areas of the video image are assigned to each LED zone and so collectively were activated to display colour and intensity as an abstraction of the real context.

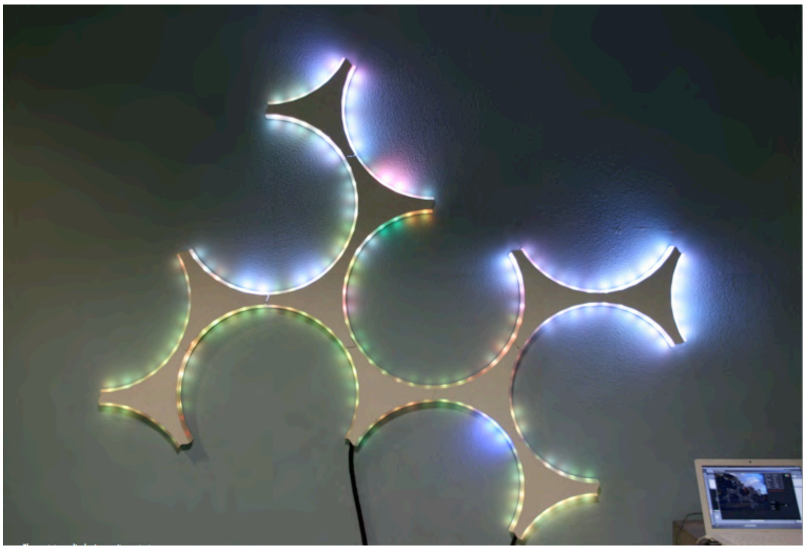

Figure 4. Geometric Pattern for the LED framework

This part of the concept is intended to be an ambient device that continuously portrays the natural changes and actions from a remote place. Movement and actions are delivered more directly as seen by the person in that remote situation. Their tangible impressions and perceptions are reproduced from a specific viewpoint and so it provides the ambient sense of being within the same position, place and time.

2.3 Lens Explorer

This prototype is a more diagnostic part of the system. It reproduces a fraction of the overall view as a higher resolution sample image that is hand-held. It is used like a looking glass and can focus and review any part of the remote context. In this way the wireless lens portrays the part of the image that it points towards, as if it was within the real place. This allows the user to 'inspect' any part of the remote context by moving the lens to a point where he wants to look. Although he is not able to see the complete context at any given time, the lens view has sufficient detail to steer the user towards other parts of the environment that look interesting. In this way the user builds his perception of the remote context from series of small details seen through the Lens Explorer. This works by mapping the position of the lens with infra-red technology, relative to a local base station. This in turn, enables coordination of the lens explorer with the viewing position and images seen by the capturing device, in the remote context. This was processed through an Xbee wireless communication module, and Arduino processor to set the correct colours to a series of RGB LEDs within the lens and the Macromedia Flash software application.

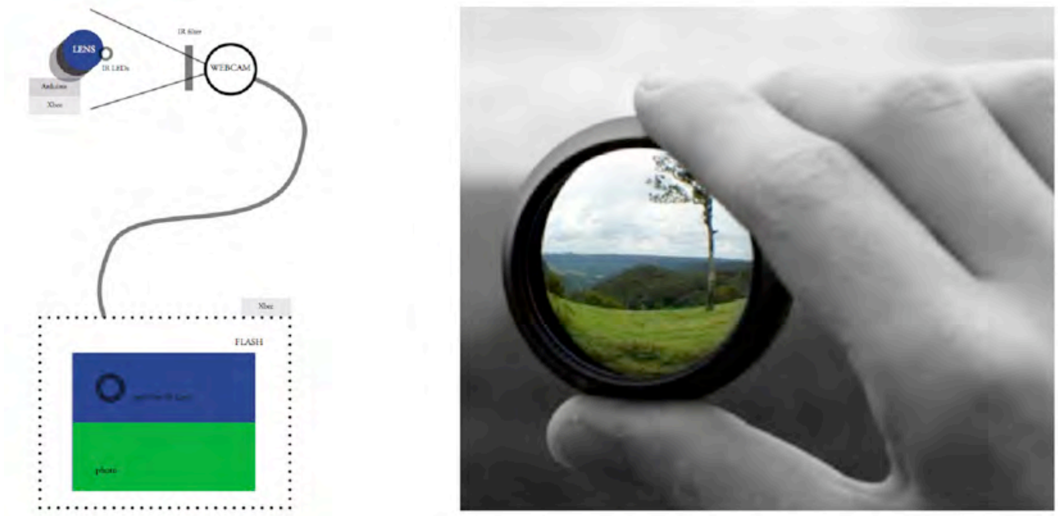

Figure 5. Shows the coordination between the lens and the captured image with the impression seen through the lens explorer.

This is similar to a navigation process where you choose the points to inspect from the information seen in the last moment. The whole remote context is not seen at once but in a series of discovered glimpses and glances, that build an impression and sense of place, rather than a full frame completed image. Natural curiosity leads us through the searching and looking process, leading from one lens view to the next. Because the movie transmitted from the remote context is constantly changing, so there is a constant desire to continue to search and explore the space.

3 EARLY OBSERVATIONS AND VALUES

- Some feedback comments confirmed that the prototype effectively provided more vivid and accurate impressions of the remote context, particularly where the context was more dynamic with greater movement – such as during active sports (eg, parachute jumping) or busy city environments.
- Through frequent viewing, users become more proficient at recognizing different objects within the remote context. There were about 10 different contexts shown and though more frequent viewing, people started to see certain visual patterns, such as flashing car headlights or moving trains.
- In supporting social relationships, the wider peripheral viewpoint engages people's interest in each other and indicates the positive values of supporting close relationships. Recent studies from 'Virtually Living Together', *Tollmar, Junestrand and Torguy,*[8], they establish within their ethnographic studies of family scenarios, that many forms of communication devices are quite randomly used to support social relationships in the home. Some users *"expressed also the frustration with being only semi-connected to their relatives"*. One of their key findings was *"that family communication does not have to be direct, often it is preferable that it is abstract"*

3.1 A System For Perception Spaces

The next step is an integration of these two prototypes where both the abstractions of the reflection planes and the more detail of the lens explorer images satisfy both the peripheral events and the searching curiosity of the remote observer. This is planned for further research work and evaluation from different user groups. Through the construction of this project, there have been some interesting technical discussions: The dynamic range and efficiency of LED systems have a fairly vivid representation of a video environment and the brightness or dullness of weather for example, is not so accurate. Further work is needed to make this more variable. Other observations that contribute to the current research work on MP3-V standards of data communication between virtual worlds and virtual-physical worlds.

4 CONCLUSION

These early prototypes illustrate different ways of perceiving a remote context, as a different approach to communicating images in real time. It proposes scenarios that support our 'perceived view' and sense of remote environments in a way that is more direct than verbal descriptions over a normal telephone line, (although it is not considered as a replacement to a spoken conversation). In this way, it affords opportunity to feel and sense an environment, through visual dimensions that follow the nature of our own behaviour and wishes and then, more naturally affords greater sensitivity and tangible interaction with our relational field.

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