

AFFECT AND GESTURE IN MULTI-TOUCH INTERACTION CASE: AT HAND

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ABSTRACT

In the next few years we are likely to see interactive touch screens embedded in urban architectures. Interactive installation *At Hand* anticipates these developments by investigating the city space as the space for affect and gesture. How do we articulate our embodied being in urban spaces? And how are these observations translated into an interactive experience at the touch screen interface? Our paper describes the process by which the conceptual thinking for an interactive installation is translated into the technical implementation of the pilot, which was installed in a public place in August 2010.

Topic and Subject Descriptors

D.3.3 [Interactive Multimedia Installations]: Design for multi-touch interaction – *politics of affect and gestures, embodied interaction, MultiTouch technology.*

Keywords

Gesture, affect, multi-touch, touch screen, interactive installation, urban space.

1. INTRODUCTION

1.1 Urban screens

In the last few years, public screens have become embedded in urban architectures. While the majority of the content on these screens relates to commercial or informational interests, there is also a growing number of urban screens related projects, which explore public screen for artistic purposes. [1] As touch screens are now rapidly creating new interaction paradigms in the personal use of information and communication technologies, we may anticipate the emergence of public touch screens in the very near future. Our installation project investigates the possibilities of touch screen interaction in public places. It approaches urban space from the point of view of affect by focusing on the micro-gestures of various groups of people and by perceiving them as the visible traces of affects.

1.2 At Hand

At Hand is an interactive installation, which addresses urban gestures, micro spaces of the street and the possibility of encountering otherness. European flow of migrations is its starting point, especially the recent appearance of beggars in European city spaces. It questions whether we are experiencing a loss in our

ability to relate to the other as a unique human being. How should we struggle against such a loss?

The project explores the experiential and expressive possibilities of multi-user touch interaction via an orchestration of intimate close-ups of gesturing hands and the dynamics of the touch interface. In the first stage of the project, a pilot was designed for the MultiTouch screen technology on the CityWall interactive touch screen at Lasipalatsi in the city centre of Helsinki. Our paper describes the process by which the conceptual thinking for an interactive installation is translated into the technical implementation of the pilot, which was installed at the Lasipalatsi square as part of the Media Facades Festival Europe 2010 between 27.8.-24.9.2010. [2]

2. THE AFFECTIVE MICRO SPACES OF THE CITY

2.1 Urban micro gestures

2.1.1 Spatial politics of the city

The conceptual beginning for *At Hand* was the realization that new kinds of micro spaces of gestures had emerged in the city space. After the year 2007 when Romania and Bulgaria became members of the European Union, we began to see Romanian beggars in the streets of European cities. The mobility of the Romans poses challenging questions to the European integration policies. But their presence and its vulnerability also make visible the processes of privatization in public spaces. What kinds of social realities or behavior are being tolerated in the contemporary European cities? Have the limits changed without our noticing it? Whose side are we taking in the spatial politics of the city when we look away from the gestures of solicitation?

2.1.2 Micro gestures

The installation is based on the observations on how people take their place, how they construct their private spaces when in public. Often this place-taking seems to happen in the form of semi-autonomous micro gestures associated with the situations of waiting. In fact, quite a bit of waiting takes place in urban spaces and in different social contexts as some wait for service while others wait for a coin. These micro gestures, which are only partially conscious, can be conceived as the visible trajectories of affects, which arise in the encounters within the increasingly controlled, and densely textured social spaces of the city.

2.2 Affect

2.2.1 Relational affect

The conceptualization of affect, which perceives it as an integral aspect of a spatial, social, technical and embodied configuration is central to the idea of the installation. The concept of affect, seen in this way draws on the work of Baruch Spinoza, who perceives affect as part of the structure of an encounter. In the philosophical outline of affect by Spinoza, the focus is on the relation between individuals, who have the capacity to affect or be affected. In other words, even if affects have a relation to the emotions of an individual, they are not identical to them. Rather than individual, affects are relational and emergent. [3]

2.2.2 Affect-engineering

As Nigel Thrift has remarked, there is a growing tendency towards engineering affects, to make use of them politically. According to Thrift, the power-knowledges of affects are fragmented, heterogenous, and extensive. One of the strategies of affect-engineering is the conceptualization of the body in terms of “micro-geographies” or “body-languages”. The formalizations of these languages can, and are increasingly fed back into the design of the urban spaces. [4] The concept development of the installation began with the question: How to re-configure affective technologies?

3. INTERACTION DESIGN

3.1 The absence of embodied touch

Conceptually At Hand thematizes touch both as the relation to the other and as an embodied experience mediated through multi-touch technology. It is important to raise the question of how touch is understood in touch screen technologies, as the emerging conventions in touch screen interaction seem to aim at immediacy, which tend to overlook touch as a sensual embodied experience. The conventional multi-touch gestures, for instance, appear to draw on the practices of managing objects, merging together onscreen practices to those of the material world.

As long as multi-touch gestures are directly related to operations of managing documents, opening or closing them for instance, there is very little space left for conceptualizing touch in terms of one’s phenomenological relation to the other. With At Hand we wanted to explore an experiential space in which the narrative would center on the philosophical imperative of acknowledging the other, while the interaction design would investigate ways for introducing this subtext to the screen space of the multi-touch technology.

3.2 Affective touch

The most central research and development question was to consider how representational, audiovisual means as well as gestural interaction patterns could be brought to bear on existing multi-touch interaction models in order to introduce the idea of relational, sensual touch. Touching a touch screen is not a particularly sensual experience to begin with. The aim was not to simulate an embodied experience of touch, but to consider how touch screen interaction could be made affective within the heterogenous space of images, gestural patterns and multi-touch screen technologies.

For interaction design, the stroking of a hand constitutes the main

metaphor. By stroking, the spectator makes his or her presence known for the imaginary other, and by stroking, one is able to explore the hand of this other. However, for the pilot we anticipated a number of spectators with very little experience with touch screens. Therefore the beginning of interaction was made more ambiguous so that almost any gesture of touch brought the spectator into contact with the hands of the other on the screen.

4. PARTICIPATORY PERFORMANCES

4.1 Script

The pilot consists of a small narrative event, in which four pairs of anonymous hands appear against a darkened background on the public touch screen. If the spectator touches any pair of hands, they open up and reveal a photographic close-up of the hand, the details of which the spectator is able to explore on skin level by stroking the screen.

4.2 Performance

For the pilot, people representing different social realities were invited to perform in front of the camera. The process of participatory filming also involved collaboration with a group of Romani people, who were looking for livelihood in Helsinki back then. One of the sites for filming was the autonomous Social Center Satama, which has been active in pursuing the politics of social responsibility and the support for the Romani people in Finland.

The participants were asked to imagine themselves in the situation of waiting, as waiting is one of those idle operations through which we perform our embodied presence in the city space. Each participant performed in his or her particular way the “script” which consisted of three parts: first imagining oneself in the landscape of one’s everyday being, second opening one’s hands towards the presence of the other and third, offering one’s hand for the photographic close-up. Together these visual elements were choreographed into the narrative event in which the spectator encounters the hands of an anonymous other through series of gestures.

4.3 The archive of gestures

The materials filmed constitute an archive of audiovisual materials, which document, by the means of participatory performance, how people representing different social realities imagine their embodied being in the city space. The CityWall touch screen provided an experiential touch screen interface for this archive. On it, the hands of four participants appeared at the time. The juxtaposition of different hands was randomly determined.

5. TECHNICAL IMPLEMENTATION

5.1 Installation interface

The installation interface, the CityWall, is a 2,4 meter wide and 1 meter tall touch screen, that is horizontally split into four evenly sized interaction areas. The resolution of the screen is 2000 by 760 pixels. The touch screen display uses a two video projector, rear projection setup on a window glass surface with infra-red lighting and infra-red cameras for the finger tracking. The technical setup was built by MultiTouch Ltd, which offers sophisticated tools for multi-user touch tracking in terms of both

hardware and software solutions. The MultiTouch system does not only track points of contact, but actually recognizes user's entire hand and its orientation. [5]

5.2 Installation software

The installation software was programmed using ActionScript 3 and the MultiTouch Cornerstone SDK, which includes the necessary ActionScript libraries for communicating with the MultiTouch software. The MultiTouch Cornerstone SDK also supports the use of C++ programming language. ActionScript was chosen for this project, because of its easy-to-use video player functionalities. The Cornerstone SDK provides a more extensive set of tools for C++ developers e.g. providing more attributes about the orientation of the user's hands. However, since the implementation of the installation only required basic finger tracking the use of C++ was not necessary. [6]

As the installation hardware was not available for the development team in the beginning of the production, software mouse emulator was used for the initial development. With simplified software tests the mouse emulator seemed to perform reliably, but as more features were added to the application, it became apparent that the behavior of the emulator differed from that of the real hardware. In addition, the structure of the ActionScript code needed optimization to overcome performance issues. For these reasons the final software development took place in the facilities of MultiTouch with the kind assistance of their software development staff.

5.3 Multi-touch interaction

5.3.1 Display of hand movements

When an interaction area is in its idle state, it shows an FLV video loop of the performer's hands waiting. Each video is looped twice after which the idle video is swapped. The new video is randomly chosen from the media library. Each of the four media players always check that the chosen footage is not being played simultaneously by any of the other three media players. Otherwise the interaction areas function completely independently of each other.

5.3.2 The structure of the encounter

In each of the four interaction areas, in the approximate area of the video loop, there is an invisible circular tracking area waiting for input. When this area is touched, the video player advances to the next interactive section, the video of the gradually opening hands of the performer. Any gesture of touching the tracking area advances the video forward bit-by-bit. For the user this appears as if his or her touch affected the opening of the hands on screen.

5.3.3 Skin contact with a close-up

Once the video of the gradually opening pair of hands has played to the end, the application opens the close-up still image of the performer's hand so that the image and the tracking area now fill the entire interaction area. The resolution of the photograph is four times the size of the interaction area, so only a part of the close-up photograph can be visible at any given time. The user can explore the details of it by dragging it along the x- and y-axis. This functionality was implemented using the built-in interaction widgets that are a part of the Cornerstone SDK's flash library. The widgets provide basic functionality for moving, scaling and rotating any content object. However, in the pilot, the interaction

with the close-up photograph was limited to the moving of the image within the frame of the CityWall interaction area.

5.3.4 Continuity

Each of the interaction areas continuously monitor the continuity of the interaction. If interaction in any one area ceases for more than 7 seconds, it returns to the idle state. A new pair of hands is randomly chosen from the media library.

6. AFTERTHOUGHTS

6.1 Imaginary encounter

It is our impression that the orchestration of the visual material and the choreography of the interactive gestures produce the experience of an imaginary encounter. An important factor for the production of this experience is the immediate response of the MultiTouch screen technology to the user input. However, and perhaps even more importantly, the metaphor of stroking constitutes a double-bind between the narrative concept and the interaction design. On this double-bind hinges both the meaning of the installation and the affective experience of the encounter. Interestingly, it turned out that the small rhythmic adjustments in the timing of each individual "encounter" were essential for creating this experience.

6.2 The politics of reconfiguration

At Hand in an attempt to construct a site, which would give a second chance for a missed encounter - the one that does not take place in the reality of the contemporary Helsinki. The reconstructed encounter is not real in more than one way. It is a disembodied gesture, which is mediated across the temporalities of audiovisual production and across the polarized social realities of the participants. It is a re-configured gesture of touch, which openly articulates its constructedness. With our installation we want to suggest, that this re-configuration could be something, that opens our being in the city towards a different relation to the other - and this relation, through becoming affective, could become real.

7. ACKNOWLEDGMENTS

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