

Critiquing Hypermediated Public Space Through Exploratory Design

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Abstract

[FIHSIHKAHLVRRCHUWAHL<>] (pronounced "physical-virtual" and abbreviated to FV) was an interactive media art installation that experimented with the integration a gestural computer interface with an architectural surface through the use of computer vision. It was exhibited within the Claremont public promenade, Western Australia (WA), as a part of the Public Platform urban prototyping competition, 2016. The project challenged the conventional use of surveillance technology as a means of controlling public behaviour by exposing its presence through playful interaction, facilitating a dialogue between participants and the authors about the use of locative technology in the design of cities.

In this paper we outline the design process and methodology in order to examine the relationship between conceptual experimentation, computer simulation, the design of the architectural form, and the design of the interactive programme. We then reflect on the outcomes of the installation, showing different ways the work generated opportunities for engaging the public in discussions about the impact of surveillance technologies in public space. We then discuss political and ethical tensions that placemaking introduces to design-research and identify how future urban prototyping projects might reveal and critique hypermediated space – public spaces in which cultural productions are tested for fitness based on their ability to attract and hold the attention of large flows of people.

Introduction

In the last decade there has been growing interest in the use of digital displays, electronic sensors, actuators, and surveillance cameras in the creation of interactive art in urban public spaces.¹ These urban interventions have emerged from a wide range of actors such as artists, architects, and designers, whose works produce novel aesthetics and critical speculations around the use of developing technologies. Concurrently, the same digital technologies are being deployed in "Smart Cities" research to develop new products and systems that increase the efficiency of urban processes such as traffic control and security.² Increasingly, these two practices have become blurred as interactive public art is utilised by institutional researchers as a means of understanding and experimenting with social behaviour. Design research conducted in the context of urban renewal and placemaking initiatives provides the benefit of a live context in which the effects of developing technologies can be tested and critiqued. However, the use of surveillance technology to shape perceptions of, and interactions with art and architecture in public space presents political issues around the agency of urban dwellers and ethical problems around the collection of user data, especially when this is obscured by the design of the object.

FV was an interactive media art installation exhibited within the Claremont public promenade, WA. The project consists of an architectural folly with integrated lights and speakers, and a gestural interface with wireless IP

camera and a computer that processes live video data to track the position of people relative to the structure. FV combined two research interests of the authors; the design of systems of parametric aggregation and methods of digital fabrication related to their construction, and the design of an interactive system, integrated with the architecture of the proposed design. Both aspects of the project were examining how personal devices, location-based social networks, and pervasive computing mediate our understanding and experience of the built environment. Many dialogues around this topic identify a diminishing role for centralised public spaces as sites of public discourse as network culture has produced a distributed and dynamic social space which influences our understanding of local contexts.³ These relationships are not evident in the embodied experience of public space and so we were interested in ways that relationships between digital information and physical space might be transformed into a spatial phenomenology.

In the following sections we discuss the context in which urban prototyping has emerged. We then outline the methodological approach to the design of the FV project to identify how it differs from related projects. Next, we examine the design process, breaking down the components of the prototype which were used to experiment with relationships between location-based data and public space. We then reflect on the outcomes of the installation itself, showing how the work generated opportunities for engaging the public in discussions about the impact of surveillance technologies in public space. Finally, we conclude by proposing exploratory design as a strategy through which future urban prototyping can be used to reveal and critique urban space that is being excessively or adversarially affected by digital media.

Digital Placemaking

Globally, cities are becoming increasingly surveilled to facilitate pervasive computing systems which automate and manage increasingly complex flows of things, data, and people. Simultaneously, networked culture has placed cities in competition with each other to access these resources.⁴ Architecture and public art play an important role in emerging practices of placemaking which aim to “activate” city spaces to increase their economic and social benefits for their stakeholders.⁵ Research plays an important role in placemaking practice as it reveals new markets and increases the efficiency of existing design approaches. Proponents of placemaking such as the thinktank Project for Public Spaces, claim that it provides further benefits for the community by “maximizing the shared value” of public spaces.⁶ Increasingly, data derived from pervasive computing and location-based social networks is analysed to optimise placemaking practices.⁷

Methodology

There are several different research methodologies that have emerged around the integration of surveillance technologies in public spaces. Using the framework developed by Faste and Faste, these can be divided into two broad categories:⁸

- 1) **research on design** aims to understand the impact of design upon urban processes through analysis of quantitative and

qualitative data derived from urban sensors and location-based social media

- 2) **research through design** develops design approaches through the testing of experimental prototypes.

A combination of these approaches manifests in concepts of Urban Informatics and Urban Prototyping. Bilandzic and Venable define urban informatics as the “development of new technological means to resolve contemporary issues or support everyday life in urban environments”.⁹ Interventions created in urban informatics research are developed in response to clearly identified problems and are presented as research experiments. Urban prototyping, on the other hand, is a form of interdisciplinary research that combines urban sociology, human computer interface design, and architectural design in the production of interactive public artworks. The distinction between these two approaches is important as the framing of research around the design of interactive public art or architecture often obfuscates value-laden approaches to research with the intent to manipulate social activity. The project presented in this paper belongs to the urban prototyping category or research through design that can be further broken down into three methodological categories:

- 3) **Materialistic Approach** is focused on directly producing benefits for material contributors. Projects such as those of Behrens et al., Dalsgaard and Hansen, and Hespanhol and Tomitsch experiment with novel interfaces, spatial effects and their integration within existing urban contexts to produce new products and processes that can be integrated into the design of public art and architecture.¹⁰ These projects are validated by their ability to transform social interactions and produce economic benefits for urban stakeholders.
- 4) **Critical-Speculative Approach** is primarily a speculative exercise designed to tease out potential solutions to urban public spaces or to point to unknown or unstated problem/s. Projects such as those described by Korsgaard and Brynskov, take an approach similar to the critical or speculative design of Dunne and Raby where interventions are used to provoke discussion and debate around ethical, cultural, social, and political issues that might emerge from the use of new technologies.¹¹
- 5) **Participatory Making Approach** focuses on finding ways of involving various parties connected to the urban space in the design process. This third approach can be seen in the work of Caldwell and Foth whose DIY urbanism takes an approach similar to participatory action research where collaborative projects between researchers and laypeople are examined to find more effective ways of involving local communities in the design and production of public space.¹²

Exploratory Design is a combinatorial approach that analyses design through the lens of these methodological categories. The Materialistic approach is embedded in the context of the FV project competition which was validated by its ability to increase levels of social activity in public spaces and

produce economic benefits for material contributors. This approach relates more to the placemaking brief of the FV project which came into conflict with less pragmatic aspects of our methodology. (which will be discussed in detail later in this paper). The Critical-Speculative approach is used in Exploratory Design to reveal ethical, cultural, social, and political issues that are presented by techno-social change, however it is less didactic in the way that it presents them. Also, in Exploratory Design the outcome is not a completed product but an open ended and imperfect prototype that is used to provoke critical discussion with a public audience. In this way it relates to Critical Making, in which these issues are communicated through heuristic engagement with the material both by the designers and participants with the work.¹³ This leads to the use of the Participatory Making approach, which in the case of this research is not validated by its ability to generate “community engagement” but through its ability to reveal relationships between emerging technologies and the production of space and share the experience of these relationships with its audience. Additionally, Exploratory design draws from Donald Schön’s concept of “reflection-in-action,” whereby design decisions are directed through interactions between the maker and the material.¹⁴ These insights emerge from an embodied interplay as the designer acts on the material, reflects on the response, and develops the design in response to unforeseen outcomes.

The Project

FV was submitted as an entry into the 2016 FORM Public Platform Urban Prototyping Competition.¹⁵ The event was derived from the Market Street Festival, which funded speculative urban prototypes to find approaches that could be reused in other placemaking initiatives. The PPUP competition shortlisted 26 proposals and provided them with seed money to produce an urban prototype. These were then exhibited at a two-day event where a jury of three professionals (an architect, an urban planner, and a politician) selected a winner. The organisers provided a project brief from which we could develop a conceptual approach, access to a public space, assistance with equipment, facilities, and insurances, and limited funding for the construction of the installation. These benefits, however, were partially offset by the deadlines and requirements of the competition, and the need to produce a design that would also effectively attract and maintain the attention of festival goers. These constraints were not entirely anticipated at the beginning of the project but were revealed through involvement in the process.

Our approach to the issue of surveillance technology in the design of public space began by experimenting with rudimentary analysis of the online presence of different organisations and businesses through a custom data-scraping program developed in Processing. This data was integrated into a spatial model of the site that also created an agent system that speculated on the confluence of flows of people both online and in space (see Figure 1, 2). As part of the focus of the urban prototyping on the idea of objects in space, we conceived of a form that developed from the same set of integrated digital analysis and modelling tools as the interactive systems. Reflecting the idea of a constantly shifting ‘virtual topography’ layered over the public domain, the form was developed as a surface influenced by simulated agents to inflate and give rise to a catenary network mesh (see Figure 3). During the design process we

integrated a carrier skeletal frame into what originally was a collection of interlocking components for structural reasons and the interactive part was reduced to a central cube element (derived from internal anchor points of the catenary network) which contained the light and sound producing hardware. The form of the components evolved from individual sensing/interaction parts to more general amplification cones for sound that were linked to the original triangular mesh subdivisions.

The idea of a 'virtual topography' layered over the public domain is carried over to the design of the digital interface. Previous installations by the authors had experimented with the use of screens to represent tracking data from surveillance cameras and the use of LED lights. In the case of this project, sound was used instead as primary output. Interactions with the artefact were framed as a game of "hot and cold", this system was chosen as a starting point for our design because of its intuitive logic (the direct relationship between cause and effect), the fact that it is a culturally familiar form of play, and that this form of interaction is directly tied to subjects' proprioceptive understanding of space (See Figure 4).

The field of interaction was conceived of as a zone around the object, defined by the limits of the field of view of the tracking camera and marked out on site as a bright dashed line to aid users in identifying where the limits of this space were (see Figure 5). Upon detection of a person entering the tracking zone, the program would place an invisible marker somewhere within. The user's position would then be calculated relative to this point and the distance and position information would be used as inputs into a sound synthesis algorithm. The synthesizer was built on a process called additive synthesis which layered a set of modulated frequencies randomly drawn from a list of standard musical notes, the result of which was an undulating waveform that's tempo and pitch was controlled by the distance of the user to the invisible object. The field of sound created by the synthesizer provided real-time feedback to the user, so that they could navigate around the object to find the invisible marker. Upon finding a point, a second system would activate, reading out the latest tweet about the event through text-to-speech software.

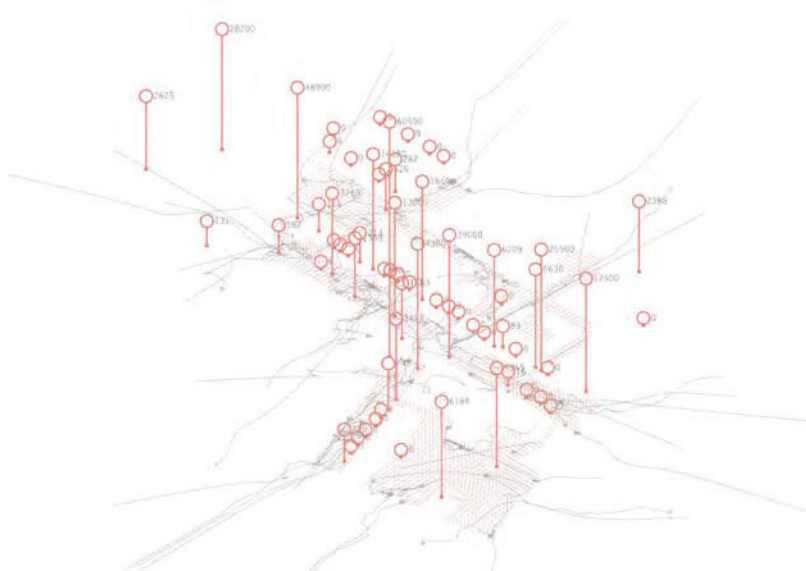


Figure 1: Agent swarm simulation visualisation based on 3D mapping of online presence of organisations and businesses forming a hypothetical field in space to which agents respond to.

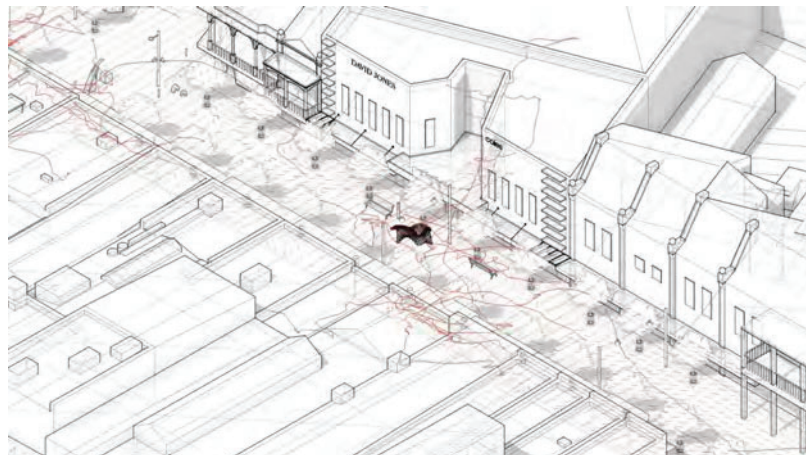


Figure 2: Diagram of agent system and its relation to the placement of the object on site.

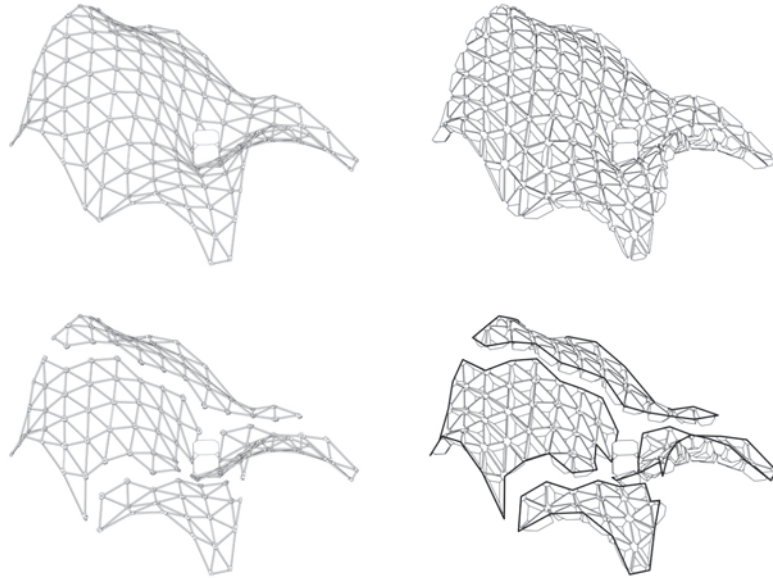


Figure 3: Isometric diagrams showing subdivision of structural system (left) and cladding system (right).

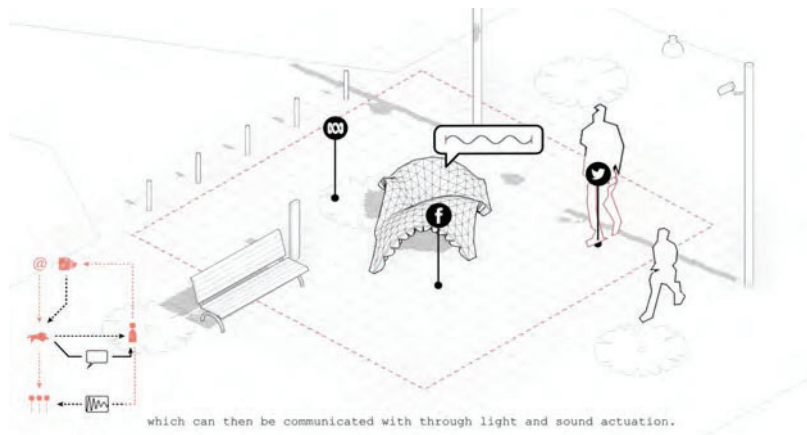


Figure 4: Diagram of interactive system.

Discussion

In the context of urban public spaces, assertions that specific approaches to cultural production are superior to others are problematic as they embody political and value-laden understandings of urban problems. These are "Wicked Problems" for which there is no singular stakeholder and no optimal

solutions.¹⁶ Despite this, claims of such optimisation from groups such as PPS or FORM are wide-spread and often give false or incomplete impression about the design process, its narrow set of parameters and desired outcomes: "Whenever a public space is judged to be successful because a community of users has been established, we should be suspicious. In whose interests is such cultural homogeneity or integration established, and in whose image?".¹⁷

The application of surveillance technologies to direct the curation and design of cultural production in public space leads to the production of *hypermediated space*. In hypermediated space public art and architecture are tested for fitness based on their ability to attract and hold the attention of large flows of people. This can be seen in the "Makers on the Market" research findings published by Gehl Studios as a part of the Market Street urban prototyping festival in San Francisco where quantitative analysis of activity in relation to urban interventions is used to justify their success.¹⁸ The validation of creative production through statistical methods is problematic as it limits the scope of action available to the public to intervene within the city through their own agency. The possibility of such a situation necessitates critical reflection of design-research practice in urban public spaces to better understand the outcomes of these techno-social interventions.

Reeves et al. produce a framework for understanding the systematic relationships involved between parties that engage with digital interactive public artworks.¹⁹ The parties they identify are performers, spectators, and orchestrators. Manipulations are the actions made by the performer/s that produce effects that are the physical or digital products of those manipulations. Orchestrators are people or software that operate in the background of the interface, hidden from public view but vital to the running of an installation. The degrees to which manipulations and effects from each of these parties are hidden or revealed sets the measure for this framework. Reeves et al. also argue that in the case of certain types of performance, the obfuscation of manipulation and orchestration is necessary to enable effective, legible interaction and more entertaining performance. The presence of orchestrators in interactive works is necessary for their functioning, however this is often concealed from the audience.

Herein lies a problem in the use of digital interactive art in public space. Any obfuscation of the relationship between the artist and the audience restricts the capacity of the audience to critically respond to the installation. In cases of non-digitally mediated public performances, this relationship between the authors and the spectators is clear. In the case of urban prototypes, participation in research is often unclear or taken without consent. Hiding the orchestration of interactive artworks may lead to more spectacular spaces and events but in the context of public space this threatens to produce hypermediated space. Urban interventions have a responsibility to engage in a more open dialogue with the public, allowing for interference rather than reducing its possibility by increasing degrees of orchestration.

In the FV project we did this by choosing to make explicit relationships between manipulations and effects so that users could respond to them. It did this by making visible the computing equipment and code it used, by making explicit the camera equipment which was collecting and manipulating data, and

by making the interactive experience a process of revealing orchestrations through embodied manipulations. The authors, as orchestrators of the installation, were also present in the space – discussing the project with the public, showing how it worked (and didn't work), and allowing people to interact with the code itself.²⁰ This added a performative aspect to the work in which we were able to discuss issues relating to surveillance and public space with those who interacted with it (See Figure 6). The systems of surveillance and control are purposefully made accessible both from the design point of view (through interactions with camera inputs and manipulation of location-based social media information) and physical exposure of its functional components. This approach aims to discover ways of revealing systems of control and surveillance, find new ways of conceiving such works that through the use of a spectacle both interactive and formal, and use interactive protocols applicable to architectural design which engage digital and hyper-mediated contexts.



Figure 5: Exhibition - performer and spectator interaction, PUBLIC Platform 2016, FORM. Photograph by Bewley Shaylor, 2016.

Dalsgaard and Hansen, Hespanhol and Tomitsch, and Reeves et al. all claim that embodied interaction with media installations in public space should be considerate of the social and environmental context that they are placed, however, none of these authors define what they mean by public space or community. The authors suggest that the use of their frameworks will allow designers to produce more “appropriate” interactions with computers in public spaces. By curating specific types of interactive experiences based on their social context, and controlling the balance between manipulations, effects, and orchestration, these projects justify their value by finding more effective ways of attracting and capturing users. Hespanhol and Tomitsch suggest that there is a social value to this in the way that it provides the opportunity for physical

interaction with people in cities which they claim has been lost due to our increasing reliance on personal devices. However, as urban theorists such as De Waal, Cuff, Massey, and Willis have identified, while digital technology detaches the public sphere from centralized public spaces, this does not reduce the capacity for embodied interaction between people in the city but expands and distributes it.²¹

If the collection and manipulation of data is obfuscated through the design of an interactive installation this reduces the ability of the user to understand how their actions are being monitored and for what purposes. While it could be argued that data related to activity in public space is a positional public good, access to that data is often determined by private and institutional interests.²² So too is the software that controls these systems and the knowledge to be able to understand and work with it. The opacity of the urban spectacle of media architecture and interactive art conceals systems of control and surveillance which are often inaccessible to the public. In public space with large crowds of people interacting with the works it is difficult to establish consent. So far writing on this subject assumes that consent is given to record information about people because they are in public space. If people were aware that this data is being used to manipulate their behaviour this might provoke a different response.

How then might artists and designers intervene within public spaces without being subsumed into processes of placemaking? The answer may be found by reframing our understanding of what public space is and its relation to cultural production. As Crawford explains, the public sphere is not a property inherent to any place or space but is an event that emerges at sites of conflict.²³ Opportunities for transgression may emerge if cultural production is approached as something that can produce public space rather than something that is sited in it. This opportunity depends greatly on how urban prototyping is approached, whether it obfuscates hypermediated space through pure spectacle, or whether it reveals and critiques its emergence.

Conclusion

Exploratory design as a novel approach to urban prototyping presents a way in which hypermediated spaces can be revealed and critiqued. This design-based methodology approach interprets construction of digitally mediated public spaces by critiquing the reliance on quantifying interactions in a space and instead emphasises the content and transparency of design of these interactions. When urban prototypes conceal the methods of digital surveillance that enable the production of spectacle, issues emerge around the agency of participants. The use of covertly obtained data to optimise the design of urban interventions to attract attention for the sake of increasing the economic benefits of public spaces for urban stakeholders contradicts traditional conceptions of public space as a site of free and open public discourse. The FV project attempted to address this problem through a design intervention which enabled users to experience relationships between locative technology and urban space in a heuristic and embodied fashion. By making explicit the digital mediation that generated the interaction conceived as part of the spectacle of the work, more open-ended dialogues between participants,

the interactive system, and the designers themselves could emerge around the idea of public space.

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