

PORTAGE: Locative Media at the Intersection of Art, Design and Social Practice

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Portage: the Canadian Mobile Experience is a research and development project, funded by Canadian government that aims to create a virtual street theatre in the arts, media & entertainment district in downtown Toronto. Conducted under the auspices on the Ontario College of Art & Design and driven by faculty researchers.¹ Portage, is conceived as a design project that seeks to investigate the possibilities for mobile innovation by employing a methodology that is rigorously collaborative and requires the engagement of a transdisciplinary team including designers, artists and social scientists, students and members of small and medium arts and entertainment industry. Having employed this method successfully in the Mobile Digital Commons Network (MDCN) our team has three goals in Portage: to bridge aspects of the digital divide; to work with small and medium industry to discover common interests and goals; to query the relationship between democracy and mobile apparatuses, experiences and design processes.

To provide an overview of the project, we'll introduce the underlying thematic intentions and processes and then go on to illustrate our practice by reviewing our current roster of prototypes we are developing and deploying. Our research involves three main design activities: object-making, image-making and system-making for mobile devices.

¹ Portage's interdisciplinary team of researchers include Paula Gardner, Geoffrey Shea, David McIntosh and Patricio Davila. Our project can be accessed at mobilelab.ca/portage.

Our design of objects includes the development of sculptural music-making elements, enhanced mobile devices or hacked lo-tech devices. Our image design includes narrative, game elements, visual interfaces, aural triggers, processed text. And finally, our systems design includes custom-made software and protocols that stitch together the experience.

We have a number of prototyped devices that facilitate both analogue *and* mobile experiences. The prototypes, which will be discussed below, allow users to choose among a range of activities that are completed individually or in collaboration to: engage in play with musical instruments operated via mobile devices, view themselves as surveillance subjects via their own mobile phones, or set off a series of visual and aural feedback loops based on the presence of mobile devices. Experiences as well are built for mobile devices that go beyond cellphones or PDA's to create locative experiences.

Portage is committed to particular design processes that, in our experience, allow for deep collaboration and reap the benefits of transdisciplinarity, transparency, and critique. One of our team's few rules is to continually imagine the intended user experience, while prioritizing possibilities for social interaction and authoring. This process, which was for us surprisingly functional and efficient, contests neo-liberal mandates of cultural practice; it continually destabilizes any position of authority or privileged knowledge, and arrests the formation of epistemological monopolies or their fruition in design strategies. In embedding self-reflexivity, the model rejects any notion that (democratic) social interactions can be universally facilitated—instead mobile designs should speak

the creative process is open to review and re-review as successful (and not so successful) experiences in the practice of creation. Accordingly, there is a fluidity in our process that is sometimes frustrating, but ultimately more responsible and responsive, not unlike the artistic process. It incorporates cross disciplinary experiences, combining cultural studies, ethnography, scriptwriting, documentary and feature film production, visual and media art, graphic and interactive design, architecture and music.

The nature of research here should be differentiated from the knowledge transfer model imagined by proponents of the “art research equals scientific research” model. The goals of that model aim at producing specific intellectual property that can be commercialized and contribute to the creative industries. Yet our research aims to create processes and methodologies that reduce barriers between user and artist/designer or artist/designer and engineer. Interestingly, our team, through collaborative exchanges with industry partners, discovered that we shared a common interest in *increasing* access in order to allow new forms of social interaction, social agitation, expression and art on the street—and to go beyond a simple commodification of these innovations.

Democracy in Design

Our methodological thinking also transcends into our day-to-day design practices and our testing. Portage has been committed to locative design and iterative design processes to build whole interactions, test data, and assess participant experiences. While we are committed to employing uninitiated users, who are unfamiliar with the project, to test our

designs, we have discovered over the course of both our previous research project at MDCN and now at Portage that this is a difficult ideal to achieve.

Working prototypes used for testing with participants tend to involve unpredictable levels of functioning that can leave them disappointed and frustrated with the interaction resulting in an inability to test. As an undergraduate institution, however, we have remedied this problem, by maintaining an active, but rotating group of student volunteers in the lab who test our experiences with some level of objectivity, in addition to using testers who are entirely unfamiliar with our projects. The findings of these tests are circulated back into the design process, contributing to our insistence on making experiences meaningful and continually critiquing our design processes. Through these practices of reflexivity and transdisciplinary teamwork, and by engaging a range of users, we have realized a commitment to processes that can broadly be described as “democratic”.

A simple definition of democracy does not suit the context and possibilities of mobile devices. Where digital devices add the element of space to the 3-D mix, mobile devices complicate the notions of space and the interstices of time and space, making the understanding of human (3D) engagement in this complex sphere a challenging question. We are of the mind that experiences within this sphere create possibilities for not only design experiences, but also unique human interactions, particularly regarding social

interaction and community building.

Put simply, mobile, by definition, brings new types of access, communication and interaction to a public space and a broader public. To that end, we suspect that a larger and more diverse public, who have not been afforded easy access to digital technologies and information systems or the training required to manipulate these, might well find interest in engaging with mobile technologies for new ends (e.g. artistic collaboration, social activism).

Indeed, residing within the Portage paradigm is a political commitment to investigating the links between agitative, democratic process — what LaClau and Mouffe (1987) termed radical democracy — and mobile design and experiences. The meaning of democracy in practice as well as structure must be considered and articulated carefully, across scales of governance, economics and in design practices themselves. Radical democracies, that embed discord and disagreement, create processes and channels that facilitate different values, or rather, demand the “democratization of democracy”.

Notably, in Portage we try to think about the radical possibilities of social interaction (and the regaining of essential, basic human interaction) that might be facilitated specifically by shared art and music experiences. We ask: how can artful engagement and play be facilitated by mobile devices in a virtual street theatre and how might these generate unique, or recall older or more local, forms of interaction that are essential to the

needs of radicalized, healthy democracies?

Critical Ethnography in the Design Process

Each project has been structured to encourage intensive collaboration among a diverse team of designers, engineers, and users, and has relied on methods of critical ethnography and what can be termed “rapid iterative prototyping” employing iterative methods during short 3-day production workshops.

Our focus on user desire is also maintained by testing completed iterations on a range of users. We employ critical ethnographic methods that seek to “purge” users of information regarding the mobile experience in an open-ended interview or focus group format. These methods allow users to experience various mobile experiences in the field while our team observes, carefully avoids suggesting to users the goals or intent of the project, and contextualizes the users’ responses to the experiences.

After researchers contextualize user comments in relation to this data, users are asked to respond to our “findings” to ensure they accurately reflect their readings of the experience. Vetted findings are then cycled back into the next design iteration. This type of critical ethnographic methodology shares assumptions with agonistic democracy in challenging narrow, often cloistered practices of research and design, overthrowing the

expert/user dichotomy — seeking, instead, an array of voices that might otherwise be marginalized or ignored in the design process.

Rich Media versus Affluent Media

This distinction leads to thinking through the various levels of technology a participant will use to access the experiences and the question of what constitutes rich media becomes increasingly more important. Traditionally, rich media has been defined in terms of dynamic, hyper-linked, audiovisual media. Ostensibly, the promise of this media was that a fuller experience could be acquired with content through a particular device. So called “rich media experiences” are consistently limited by what the technology can output thus crushing the potentially wide expanse of information into a relatively narrow bandwidth.

Alternatively, rich media can be defined as the vast spectrum of sensorial information provided by a locative outdoor experience. This is not necessarily independent of the technology in the hands of the user but rather a consequence of its use in the environment. This kind of rich media is more dependent on the combination of a mobile device and a public context and less on the sophisticated capabilities of the device alone. The realm of high-end devices (capable of multiple communication protocols, audio, video, GPS location, etc.) can in turn be thought of as “affluent media” geared towards

the delivery of content residing more in the device itself, and therefore dependent on the ability of consumers/citizens to acquire the means of participation.

Technology and Methodology

Portage has adopted an iterative creation cycle as its main design methodology. In software engineering, the iterative cycle requires that an application be built in a rough form and tested with users for effectiveness and unforeseen complications. Revisions to the functionality and refinements of the overall application are then implemented and retested. This process is referred to as workshopping in theatre or referred to as jamming or improvising in music. The point is to envision a series of versions of a mobile, interactive experience, each delivering an increasingly enhanced experience and requiring more complicated software and hardware engineering. Before moving from one version to the next, testing would be done, sometimes indicating the need to backpedal and other times suggesting a new tangent in the development path that could be more fruitful than what was originally planned.

Digital Divide

Our desire to bridge aspects of the digital divide has also resulted in Portage broadening its notion of a user's mobile locative device to include not only low-end cellphones and high-end smartphones but also Nintendo Wii's, Sony PSPs and potentially other consumer electronics.

The digital divide also exists at the creator level. Portage, within the university and with artist-run centres is sponsoring and engaging in workshops that lower the barriers between artists and the art of programming mobile devices. For example two workshops this summer introduced to very valuable techniques: the first teaching Python scripting on Nokia phones; the second hacking techniques to access the accelerometer and Bluetooth connectivity in a Nintendo Wii. Processing and PureData workshops are schedule to take place this Fall.

In Portage, accessibility is also being thought of in terms of literacy and not just access to advanced devices. To address this we push the thinking of our experiences to include a range of interactions that require various levels of literacy: analogue devices such as drums require the least amount of initiation; hybrid devices that track movements but have essentially non-digital interfaces such as cardboard boxes with accelerometers; high-end smartphones that require users to be very comfortable with mobile user-interfaces, application installations, connectivity, etc. And here we make the distinction between interactions in terms of modes and not levels. Each mode is capable of delivering a unique kind of information.

Programming Environments for Artists & Designers

The work in the project has also revealed the various technologies available to artists and designers for mobile research—specifically those that can be employed in a rapid prototyping environment such as Portage’s charettes and iterative design process.

We have essentially worked with open-source programming languages and environments that have the support of a broad community of developers. These include Python, which features a simplified syntax, making it ideal for novice-programmers to create working prototypes. Nokia in particular has supported this language and has provided a solid library with which to access many phone features. The drawback though, for this particular environment is the lack of support across a wide variety of mobile devices. We have also used Processing (both the standard and mobile versions) to create iterations. Many aspects of creating programs have been simplified in this environment that make the creation of visual designs very easy. In this respect it is well suited for designers and artists. Processing, because it is based on Java, is inherently more compatible on a wide variety of devices yet its mobile libraries are less stable. We have also used PureData, a highly visual programming language for audio and visual projects, to create prototypes. Although this environment does not work on a mobile device we are creating plug-ins that will allow phones to control processes in a PureData application.

Finally, Java and C++ are never completely out of the picture either. Although they are more complex with their attendant steep learning curves and do not easily facilitate rapid prototyping in an art context we have found that we, on occasion, need to resort to these languages to access either more efficient processes or functionality not available in higher-level languages. As well, we are testing and augmenting the “Mobile Experience Engine”, a new open-source XML-based software development toolkit developed in

conjunction with Concordia University and Banff New Media Institute that simplifies mobile phone programming for designers.²

Charette Process

Testing and design come together in our rapid prototyping and charettes that focus ten to twenty artists, designers and engineers on a number of specific and narrow challenges. In contrast to brainstorming, which typically allows everything under the sky to be explored, the charettes ask for as many possible solutions to a specific problem to be imagined, developed and tested in a very short period of time: usually two or three days. This non-critical development environment favors quantity over quality; it assumes that ten working solutions to a particular challenge are likely to result in the discovery of the ideal one.



² The MEE will be available at openmee.org.

Based on our past success in conducting these rapid prototyping workshops we will bring various iterations of the prototypes in production to the charette in October 2007.

Charettes mainly focus on content rather than the fundamental design of prototypes.

Given the provisional nature of prototype and the intensity of the charette collaboration, artists and designers inevitably push the boundaries of the prototypes already designed into areas not considered in the previous stages

We have found that designers and artists were eager to engage in larger theoretical and political issues as they worked through practical issues and creative implementations.

The Portage charette process also allows participants to create in various modes. Some participants will write programs, some will create circuit boards, some will create musical instruments, and others will draw out the flow of specific interactions or conduct site-specific user research.

I Spy – Looking Back at Video Surveillance

In building virtual, interactive user experience in city streetscapes, we have examined the existing infrastructure of ubiquitous media and the saturated hertzian space in which telecommunication signals pervade the very atmosphere that we move through. Like in any major downtown street, our target street is littered with video surveillance cameras. There are at least 20 obvious cameras in this one-kilometer and presumably many more that we have not been able to locate.

Importantly, many recently installed video surveillance cameras deliver their signals back to a monitoring station by WiFi or radio signal transmission. (In one famous revelation of this practice, a halfway house for recovering drug addicts mounted cameras inside their washrooms. Trucks nearby, which now use video cameras on their rear bumpers and transmit the signals to the cab so drivers can back up safely, found themselves receiving and viewing these broadcast invasions of privacy.)

Additionally, our research has revealed to us that recent studies in England show that the general population is quite unconcerned with being constantly monitored, presumably in a social contract which guarantees increased safety. We consider this finding critically and seek to query, through this project, how visitors to our virtual theatre will respond to the presentation of ongoing surveillance, when individuals become surveillers of their selves and of the situation they find themselves: redefined as surveillance subjects.



As such, I-spy seeks to bring the question of public surveillance to users, through experiences in which we surveil ourselves. We are obtaining permissions to use (and installing if necessary) 12 cameras along this street that will cover most of the pedestrian traffic that exists there. Then we are creating applications on mobile devices (cell phones, laptops and Blackberrys/PDAs) that will receive these signals and encourage users to recognize themselves on the screen and try to find the location of the originating video camera.

Each camera's signal will be broadcast to our lab's server through a WiFi connection provided by Toronto Hydro Telecom, a public utility which has recently installed ubiquitous WiFi coverage in downtown Toronto. The video will be reformatted for optimum viewing and transmission on the server and then redistributed back to the participants' mobile devices.

This redistribution poses some significant structural and access challenges. One of which is that Canadian data rates for cell phones are prohibitively expensive. For example, a half hour engagement with our prototype could cost the user hundreds of dollars. The diversity of platforms and operating systems on cell phones makes it difficult to write a custom application that will manage video display (a problem common to many interactive cell phone applications). Finally, there is a vast disparity in the capability of phones and other devices for connecting to various networks and displaying video at all.

On the high end of costs, and in pursuit of a research addressing a range of technologies and communication venues, will create a version of the video client application for a cell phone and/or Blackberry that relies on the GPRS network, but will primarily use it for testing and highlighting the problems with pricing policies in Canada.

A variation on this will explore using a series of still pictures to be more accessible to a larger range of devices and to cut down on the data transfer costs significantly. And subsequently, another iteration we will connect users to the WiFi network and deliver the signals through the Internet, completely bypassing the cell carriers. While this could be very effective in a saturated region like downtown Toronto, currently very few users own devices that are WiFi capable. In partnership with Research in Motion, the manufacturers of Blackberries, we will try to develop a client software for those devices since they are increasingly video friendly, WiFi capable and now have GPS locators imbedded within.

Sound Sculpture

In order to create a participatory, co-creative experience for users in our virtual streetscape theatre we needed to imagine a location specific, activity oriented interaction that would accommodate and encourage multiple users to engage. As always with this project, we were eager to highlight and address the range of capabilities that could be characterized as the digital divide: users with high-end smartphones, users with low-cost, less-capable cell phones, and passers-by who owned no mobile devices at all.

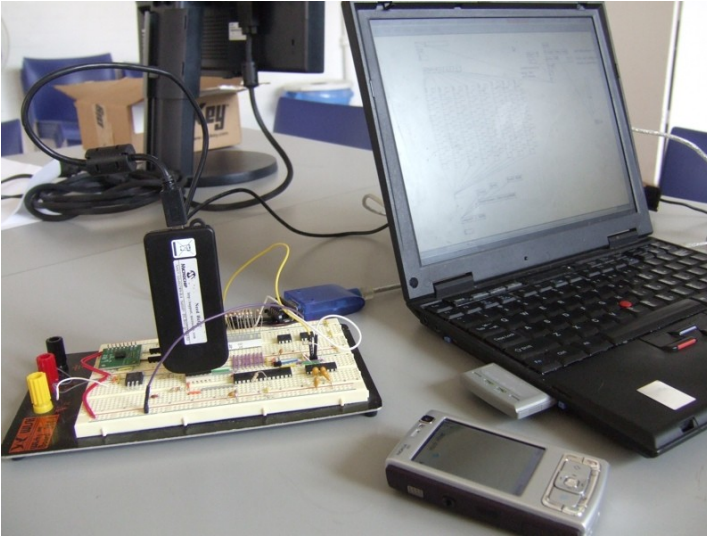
The sound sculpture builds a platform or infrastructure that revolves around a physically installed outdoor wall on which are mounted 10-20 electro-mechanical sound-emanating “instruments”. These may include strings which are tightened, loosened and plucked to create musical tones, steel drums which are struck by solenoid controlled hammers, whirligigs which drone or whistle, etc. Each could be individually controlled by a visitor standing near the wall with the result that several people could congregate there and “jam” in real time.

We are currently constructing two types of control applications: one for Bluetooth-enabled devices and one that simply uses touch-tone signals (DTMF) off a standard cellphone keypad. Other visitors, who do not have devices, will also be able to participate. For example, pick up a mallet and beat on a drum directly.

The first Bluetooth application we have developed is a rhythm sequencer: drum machine software that is controlled directly through a visual interface on the device. At its simplest level a user entering into proximity of the wall will be alerted that they are able to download and install this application. Once it is running on their device they will see a graphical display with 3 channels and 8 possible beats per channel. By selecting channels and beats the user will be able to program how a 3-drum instrument plays.

In our second interface we are using a combination of GPRS, VOIP and Internet to

deliver a signal to another Pure Data application; this technology is shown in the picture that follows. In this case a user simply follows instructions on the wall and dials a local phone number. They are connected to an inexpensive VOIP service that will deliver the command tones generated by their keypad pushes to our server running within the wall.



Although the VOIP based interface was conceived as a low-end alternative, available to any user of any cell phone regardless of their features, it revealed certain additional capabilities that we will incorporate. Since it is an inherently two-way audio connection we will be able to install microphones on the instruments and return a mix of the wall's combination of sounds to the user's phone in real time. For a user standing in front of the wall this may seem unnecessary, but the second capability that emerges from the use of GPRS and VOIP is that anyone with a cell phone (or land line) anywhere could dial the number and take control of one instrument. For these users, feedback about the overall

audio effect being created is important.

Charettes

As in our other work the creative act has three stages. We are primarily responsible for imagining the overall capability and user experience and developing the technical platform (applications, protocols and physical actuators) that would support and deliver the experience. We will work with artists, designers and students in the charette to develop and create the actual instruments that will be installed on the wall sculpture We imagine these will be quirky, innovative and expressive of each artist or designer's vision. Finally, the completed wall will do nothing until actual users take control and start injecting their ideas of sounds, songs or other audio compositions. The function of the sculpture is to clearly define a shared physical space that intersects with a shared virtual space. In keeping with our aim to bridge the digital divide and at the same time, to avoid profiling users, we seek to understand how and why individuals choose their form of interaction.

The approach we have developed addresses research and development, with an incorporation of transdisciplinarity and a balance between an end product (i.e. the participant experiences) and a process which is inclusive and self-reflexive is a natural outcome of our situation working within an art & design university. We have found that social, cultural and theoretical issues are woven throughout our practical process. Which in turn has led to our focus on issues of the digital divide. The combination of art-like

processes, design-driven skills and a critical grounding result in a productive dynamic that, while not supplanting industrial or technical research, complement those in terms of technical and procedural findings and relevance to an emerging and expanding class of empowered users.

The expectation that we are working in a terrain of shifting social and cultural possibilities fuels us, and surely other researchers, in this field. The opportunity to participate as active contributors is, after all, the core principal of any kind of participatory democracy or active citizenship.

The Cicada Project

The natural environment is never far away from any discussion of technology, mobility and public space. Through various discussions and walks along the length of John Street (our project site) our researchers became aware of the experience of moving through different urban environments. From an urban park to a business district to an entertainment district the pedestrian experiences sharp contrasts that pit trees and grass in an urban park against the concrete and brick of a downtown core. This provides the backdrop for a look at the user of both spaces (which tends to be the same person) and their implication in the formation of these environments.

Our team began to ironically note the similarities and contrasts of human and insect swarms and to consider how mobile technologies might facilitate some strange and

interesting dialogue between us. Cicadas are loud tree infesting insects that emit a sound like crickets that is familiar to most North Americans. These insects are the inspiration for the Cicada prototype that uses the metaphor of insect communication to bring into sharp relief the Hertzian environment that facilitates the navigation and organization of a city and its place within a city dweller's movement through natural and industrialized space.

The user scenario is as follows: Users of Grange Park (at the north end of the project location) who carry an active mobile device will set off a series of feedback loops that will alert them of the nature of the devices they carry. This will be achieved through the installation of a series of sensors (EMF, proximity, etc.) in an urban park walkway. By employing the metaphor of a swarm — a phenomenon that occurs in both social and natural environments — around the mobile user, the Cicadas project brings into focus for the park visitor the relationship of humans, technology and the natural environment, through a an experience that is interactive, albeit in a passive manner.

Three kinds of electronic “insects” will be installed in the tree canopy of the main path in the Grange Park. Each group of insects will have a special ability: to emit light, to emit sound and see park visitors. Notably, this experience requires two different user activities: entrance into the space of the installed cicadas, triggering their excitement with the EMF leaking out of their phones; and recognition that these faux insects are in fact responding to their and others presence. It is entirely possible that a non-user of cell

phones will recognize the correlation and be able to enjoy observing the cicada's reaction to mobile-equipped passers-by, even if those passers-by are too engrossed in their other activities (like talking on a cell phone) to pay any attention to our installation.

Passive interaction with the environment is at the heart of this public installation project. We are interested in what happens when users not intending to engage become passively engaged and trigger occurrences. Might they, for example, become interested in the possibilities for employing mobile technology as a community/swarm experience, even as they learn to be aware of (invisible) technologies in their environment that trigger responses that might be either beneficial or troubling to the social ?

Future cicada iterations will allow users to choose the swarms reaction (lights, sound, etc); to change or move the sensors in order to measure what constitutes the swarm (density/scale, directionality; and to send feedback to the system thus altering how swarming will be measured and the swarm reaction. We also aim to incorporate elements from other prototypes, such as I-spy to imagine a enable users to choose between intentional and passive participation in their own surveillance or in instigating a public racket at the Cicada site. In this way, we are compounding and recombining again our research questions, in an effort to take full advantage of the interdisciplinary team and to reflect and breed practices that are collaborative and, at their heart, democratic.

In Conclusion

We have been heartened to discover that the arts and entertainment industry partners (representing small and medium sized industries) and our local wireless utility (Toronto Hydro) embrace our democratic process and commitment to bridging the digital divide. The former are composed of individuals whose commitments ultimately lie in the artistic process and social benefits of art. The latter are willing to attempt a new design method—driven by process rather than by profit.

We are increasingly satisfied that “giving ourselves up to the process”—that is, is our methods marrying reflexivity, transdisciplinary collaboration, and rigorous brainstorming and a commitment to user desire —does yield innovation and does satisfy user desire. In this sense our process disproves the laissez-faire theory that profit and competition breed ingenuity and progress. Indeed, progress in Portage is wedded to agonistic democratic practices that begin in methodological conception, continue in design processes and practices, and spiral continually back through user desire and experience of our prototypes.

Importantly, these commitments have resulted, from the early stages of Portage, in our team altering our choice of authoring tools, seeking new types of mobile devices (the Wii), and new types of connectivity that will facilitate communication in a range of environments (from northern and rural Canada to third world towns and villages). That these alterations to our methods occurred, prove to us that the means will produce ends that are appropriate. In other words, the ends will reflect our ideological commitment (to

democratic practices) and while they are constrained somewhat by our design limits, the projects evolve out of agitation and thereby reflect public desire and reveal their bias and problematics.

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