Chapter 16

Net_Dérive: Conceiving and Producing a Locative Media Artwork

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Introduction

The rapid uptake of mobile telephony, the high bandwidth network access afforded by 3G networks, and the increasingly powerful multimedia capabilities of modern mobile handsets have created a potential for new forms of creative cultural works to be conceived for, and deployed exclusively on, mobile devices and wireless infrastructures. However, commercial offerings in the area of mobile media at the time of writing, indicate a tendency to simply extend traditional media into the mobile sphere. Typical propositions include television on the mobile phone, and downloading music to the mobile. What are the forces and constraints that limit present day usage on the mobile to simply parallel what we do in the living room or on a stationary computer? Instead of replicating traditional media in a portable package, can we not look at the mobile phone and high bandwidth mobile networks as an artistic canvas on which to create entirely new forms of art? We broach this question with a focus on mobile music, and present Net_Dérive, a multi-user mobile artwork.

We first present the field of mobile music and identify the characteristic specific to music making in the mobile sphere. We next present conceptual issues in composing a scenario that leads to an abstract shared narrative. We describe the implementation of these concepts in a working hardware/software framework, and discuss the issues involved in exhibiting the work. We will see from a musical perspective how participative, flexible content forms can be created.

Mobile Music

There are increasingly sophisticated commercial offerings in the marketplace that combine the functions of a personal music player with that of a mobile phone. These products often co-opt the term, "mobile music".[1, 2] While they indicate the potential convergence of functionality and point out interesting trends, they could benefit from research of the sort presented in this book – of user centred design, cultural theory, or in the case of this chapter, investigations of new media content composition strategies.

Other areas where commercial and grassroots developments have brought about new audio formats include ringtones and podcasts. Ringtones are one of the main ways of personalizing a mobile. The music industry, as much as it resisted the shift to downloadable music, has embraced ringtones as a significant revenue source. This represents not a new market but represents the shift of purpose of music as an *accessory* for the device, to heighten its personal uniqueness.[3]

Apple's iPod/iTunes system brought with it a form of audio distribution, the podcast. which allows RSS feeds of audio content to be heard on a personal music player. It maintains the

radio model of broadcast, transplanted to a download-and-synchronise mode of usage. It should be noted that podcasts are heard in deferred time. They are not live, but are produced, recorded, stored, and downloaded as static audio content. In this sense they do not adhere to the "Anytime, Anywhere" spontaneous credo of mobility.[4]

While personal music players and cell phones share many qualities – they are portable devices, they are audio devices, they are highly personal devices – in the end they each serve very different social functions. Here we discuss the conceptual foundations that led to the production of Net_Dérive, an artists' project that seeks to exploit synergies creatively and identify ways to couple communication channels directly to musical form.

Creative Potential Of The Medium

To better understand the non-obvious nature of merging the personal music player and cell phone, we look at social functions of these devices. More specifically, we identify these distinctions and seek out ways in which to bridge these differences to imagine what new forms of music and multimedia could emerge from this combination of technologies that would not have arisen from non-mobile contexts.

The Walkman is a cultural icon that evokes a sense of mobility and ubiquity of one's personal music. This gave rise in generalized form to the personal music player, that often allow a user's entire music collection to be stored and transported in compressed data formats such as MP3. Du Gay[5] and Hosokawa[6] discuss the cultural impact of the Walkman, du Gay using its introduction as a kind of technology artefact in a case study for a cultural studies analysis. It can be thought of as a kind of *a posteriori* form of Gaver's *cultural probe*[7] or Hutchinson et al's *technology probe*.[8]

A mobile telephone also evokes a sense of mobility, but from the perspective of connectivity with a community of friends[9]. There is a natural tendency to map the cultural analysis done with the Walkman to the mobile phone, with the desire heightened when dealing with questions of music on these portable devices. Goggin[10] and Hemment[11] draw respectively on du Gay and Hosokawa to tease out this connection. While he recognizes the attractiveness of the comparison, Goggin notes that the mobile phone, unlike the Walkman, "is not a stand-alone technology", and that "the complexity of the commercial, technical, and regulatory characteristics of the cell phone are not brought together by one company, brand, or technology in the same way as the Walkman." Hemment draws upon Hosokawa's contextualizing of Walkman use as *doubling* media space and physical space in the way that contemporary Locative Media does, however concludes by remarking that the "Walkman user serves as a metonym of the atomistic individualism of the 1980's…" while "the mobile phone could be taken to stand for the connectedness of contemporary global societies…"

A fundamental difference between a personal music player and a mobile phone, then, is the private, nearly isolated experience of headphone music listening with the anywhere-anytime communications of mobile telephony. Users in interviews report that they use personal music players to block out the external environment, to create their own private sphere.[12] Meanwhile users of mobile telephones report a desire to be in continuous touch with the outside world. These two desires, both grounded in the desire to control one's immediate environment, seem diametrically opposed. The distinction however is not so clear cut, as music, whether listened to in isolation or not, helps a listener forge her public image to be displayed and projected.[13] And while mobile phone users want to be reachable at any time, they also want to control accessibility so as not be bothered at inopportune moments or at

times when they desire privacy.[14] Reconciling these personal and public spheres becomes a central concern in the design of a mobile system, and is crucial in the consideration of a networked interpersonal music system.

Turning the City into a Canvas

The use of mobile, networked, location-aware computing devices to involve participants in mapping processes, social networking or artistic interventions is often associated with the field of artistic practice called "locative media." Transforming geographical space into a canvas to be inscribed with personal narratives, the field offers a powerful instrument for communities of participants to co-author and shape their environment and to collectively organize and share subjective experiences.

Locative media practices operate in the paradoxical space[15] between two antagonistic forces: the bottom-up approaches of collaborative spaces and collective interventions and the top-down strategies of centralized power and remote control. The reliance on positional precision and location-based context also critically link location-based practices to the arena of cartography and its dominant practices of mapping. Mapping is a cultural, political and epistemological activity, and has always been a powerful instrument for masking difference, making borders, and producing coherent identities.[16] Looking critically at the ambivalences involved in deploying these technologies bears the potential of opening up a *third space*[17]; a space for intervention, in which these power relations can be investigated and negotiated.

Electronic networks and mobile artistic interventions have transformed the notion of the everyday, the public, and the potential of social relations therein.[18] Mobile social software puts social networks into the mobile sphere, with projects like *Dodgeball* allowing friends and friends of friends meet serendipitously as they move about a city.[19] Interaction with the immediate surroundings is added in projects tagging physical space, such as *Socialight*, *PlaceLab*, *PlaceEngine*[20]. *Sonic City* draws upon notions from ubiquitous computing and wearable computing to create a portable music system that responds via sensors to changes in the ambient environment as the user walks through an urban environment.[21] Looking at the wider scope of public authoring, the research group Proboscis developed a mobile software platform for annotating geographic places with text, images and sounds. Their projects *Urban Tapestries* and *Social Tapestries* demonstrate new social and cultural benefits of new mobile technologies through playfully sharing local knowledge.[22]

The Compositional Materials Of Mobility

Music has always brought artistic insight to popular culture, where musicians remark on societal and technological change through new musical forms. Here we give some examples where developments in recorded media have given rise to new musical genres. The 45rpm vinyl record holds only four minutes of music per side, helping define the rock 'n' roll single. With the 33rpm and its twenty minutes per side, artists conceived the concept album. When the total time went up to 74 minutes with the CD, musicians stopped trying to fill the disc with music and instead made *unexpected use of the medium*, taking advantage of the Red Book CD specification to play artistically with pre-gap or simply leaving a long gap of silence at what seemed like the end, putting a surprise track long after the listener thought the album was finished. The characteristics of new recording media, then, have directly driven the conception of new musical styles.

It seems natural, then, that artists would seize the possibilities afforded by network distribution of music and formats like MP3 to once again create new forms of music. However, while the Internet has transformed music distribution and dramatically enhanced access to less known music, it has yet to have a direct impact on musical style.

The term *idiomatic writing* is used to describe the process of composing music that takes into consideration the characteristics of an instrument. If we apply the principle of idiomatic writing to mobile devices and infrastructures, the challenge becomes to find the distinguishing characteristics of the medium that might lead to musical qualities specific to that medium. In the case of mobile telephony qualities that we identify as defining the medium include:
- dynamic location
- multi-user contexts
- *in vivo* situation in the urban environment
- bidirectional dynamic (audio visual input as well as output)

In the point of view put forth here, these are the qualities of the artistic canvas proposed by mobile telephony. The challenge that confronts the artist is how to create music that responds in a profound way to these locative, social, interactive dynamics.

The use of interactive, participatory, and location-sensitive technologies poses an interesting set of compositional, aesthetic and technological challenges. First, the materials with which one must compose are largely derived from unpredictable sources. Second, the incoming data must control visual and sonic instruments that drive the evolution of the piece in perceivable ways. Third, these audio-visual real-time instruments must respect and support the conceptual motivations behind the mobile-culture dynamics. Finally, working with mobile technologies is simultaneously a glance into the future but also a reminder of the past; many amenities, functionalities, and power of modern computing technology on which we depend were only beginning to be available on mobile platforms at the time of writing.

The goal in the present work was to map the locative data of multiple users to a single musical flow. The incoming data that we sought to transform into musical information included geographic location of the users, the sounds in their immediate environment, as well as the visual field surrounding the user. Sounds picked up in the environment as well as images captured by the on-device camera become the raw materials to be sculpted. From these raw materials, advanced signal processing techniques are utilized to build software with the articulate potential of musical instruments. Analysis-resynthesis techniques are applied to these raw materials create variations and augmentations of the source sound that still retain their connection to the original. For example, street sounds from the neighborhood are spectrally analyzed in real-time. The analysis results are then applied to other audio instruments in order to harmonically tune them to the environmental sounds. Cartography and data visualization play important roles. Collective parameters like the area covered by all of the mobile participants or their average distance from the gallery affect the overall diffusion, presence, periodicity and reverberation of the resulting music. Simultaneously, each mobile player is also sonified independently by a number of dedicated instruments; individual parameters like each mobile participants level of activity, speed, or proximity to the other players are used to control these dedicated instruments.

Net_Dérive

The artwork Net_Dérive was realized to examine the compositional, aesthetic and technological questions posed above. It is an installation piece extending beyond the confines of a gallery, to include the urban environment. Deployed on portable, networked, location-aware computing devices, the goal was to apply the notion of idiomatic composition to create a kind of musical instrument, thinking of the city-as-instrument.

Net_Dérive was presented in October 2006 at the gallery, Maison Rouge, in Paris. A geographic zone in the Bastille quarter surrounding the gallery became the active zone in which participants' GPS coordinates fed the audiovisual generation system. Participants' meanderings in this neighborhood became data to go through abstract visualization and sonification techniques. Participants pick up a mobile device at the gallery site. The "device" is a spandex scarf inspired by the field of wearable computing, inside which are two mobile phones and a GPS module (Fig. 1). They are given a "mission" to carry out in the surrounding neighborhood. The screen of the phone serves as a graphical display visible at one end of the scarf. A pair of headphones is connected to this phone. The GPS unit reports geographical location to the server. The second phone automatically takes a series of photographs using its built-in camera. These images are auto-uploaded over the mobile network to the server.

A purpose built live multimedia program generates an audiovisual stream based on this information, and is fed back live to each mobile client. GPS data reporting the positions of the three users drive the rhythm of radar-like blips, creating a shifting polyrhythm of tones, each blip tone representing a user. Voice instructions suggesting paths to follow or turns to make are triggered by certain latitude/longitude combinations, and heard by the user, abstracted in a musical fashion. As the user chooses to heed or ignore these instructions, a trace of his path is carved out in the city. Finally there was an audio upstream from each mobile serving as a roaming live microphone with each user. These sounds of the streets were cut up, looped, processed, and mixed to be played under the blips and voice commands. This applied notions of *musique concrète* to compose with and activate a listening of real world sound objects. With this "concretized" mix streamed to the mobile back in real time, this process became live and locative, giving the listener an abstracted soundscape to colour her perception of her immediate surroundings.

The simultaneity, history, and memory of the various users' paths and uploaded images shape a series of abstract visualizations and sonifications of the incoming media and data that we consider a collective narrative and that is summed together and projected in the main gallery space. There is a feedback created as the users' actions generate the collective narrative that in turn direct them.

Metaphors for Creating An Abstract Narrative

The approaches described above, including the musical mapping of incoming data, the paradoxical space of locative practices and the technical framework, then shaped the task to compose with the materials at hand and to develop conceptual underpinnings to tie them together. This sought to place the technologies called upon, not as neutral, but as charged with cultural association. Pre-existing conceptions among the users of technology, urbanity, and the mobile telephone as societal object forcibly color their perception of the work. By playing on these pre-conceived notions, we could use them as a springboard to invite the users to extend their sense of the culturality that mobile technology affords. In order to

connect to existing cultural associations and extend these towards an abstract conceptual space, we identified several metaphors that provided familiar points of departure.

With the technical functionality and usage predicated on location tracking, audio/visual media upload, and urban navigation, we put in place metaphors of *archaeology*, *surveillance society*, and *air traffic control*.

Surveillance was the most straightforward association to draw upon the collective conscience with regard to location tracking. When performing geographic localization, we are following the movements of the user in an invisible way. It recalls notions of a Big Brother control society where the authorities have continuous awareness of a citizen's activities.[23] From this perspective, the act of using mobile phones to track location needs to be looked at critically, and becomes an act of appropriation to be used in creative purposes such as the narrative instruments we created that observe and interpret the player's movements by means of abstract visualization/sonification.

We sought to use the metaphor of surveillance in two ways, direct, and in inversion. The direct interpretation of surveillance rests on the simple notion that the users are being monitored without their explicit consent. At the same time, inasmuch as surveillance technologies are today a reality, societal concerns of a control society seem lessened. Why is it that the general public does not seem concerned with questions of invasion of privacy that advanced communication technologies potentially represent? One explanation is that the omnipresence of consumer devices has created a revolution in *grassroots journalism*. Beginning with the Rodney King video in 1991 denouncing police brutality[24], amateur video has often been the first camera on the spot, be it for the tsunami in Southeast Asia, or the crash of the Concorde[25]. The proliferation of blogs and decentralized information dissemination perhaps gives a sense of empowerment to the public, from which they are perfectly content to give up some privacy in exchange for empowerment. The end user, then is today as much in power to report on events in the world than the establishment. The question of balancing of power, or tension between powers, respectively, and its potential inversion of observer and observed create the second dynamic we wished to put in place in the work.

Air traffic control takes location tracking and adds elements of multi-user coordination and commands. In our work, this adds a dimension of control dynamic in whether participants would heed commands from a "mission command central" or not. The conceptual layer has also directly informed the audio-visual metaphor for displaying the participants' location, which we will describe in more detail later (Fig. 2).

Finally, archaeology brings a totally different kind of metaphor, adding the dimension of memory and historical accumulation over time. Archaeology, a discipline that is commonly referred to as studying cultures of the past, provides critical concepts for mapping people and objects in space and time.[26] We explored the archaeological metaphor as a way to create a dynamic through which the users' paths are inscribed as traces in the memory of the system that could be excavated later in time by other users. We wished to transpose this discipline from a study of the past to a way of looking at the present, the recent past, and the instant. The permanent movement in urban environments creates daily strata, not so much to be excavated, but to be swept over by street cleaners. The tracing technologies we put to use allow us instantaneously to look at these quotidian micro-histories. The act of walking carves

grooves into the city asphalt and expresses the notion of depth under the city streets; an archaeology of the instant along the urban fabric's vertical axis (Fig. 3).

With these metaphors we sought to create a technology platform to connect sound and abstract visuals to conceptual notions of urbanity. The contemporary city is no longer only a significant geographical entity but a complex fabric of interlaced physical and virtual networks. Forming a fluid terrain, these networks link and constantly re-link urban spaces. The dynamic connections not only manifest in electronic flows of information, but also in the form of subjective geographies – memories, identities and other forms of belonging. *Net_Dérive* explores this multiplicity by looking at the city through the "fictitious thickness"[27] of another –invisible– city, the virtual spaces spanned by mobile technologies.

The Dérive

The audio-visual language of our work, its sonificiations, visualizations, and spatializations of 'grooving,' 'excavating,' and 'shifting' allude to the idea of the Situationist dérive (drifting). Re-invoking forms of urban intervention, such as the psychogeographic dérive, the work's collectively constructed temporary spaces encourage encounters from outside of our contained, routine driven realities.[18] The interventionist walking practice of the dérive developed by the Situationist International was in Guy Debord's words "a technique of rapid passage through varied ambiances"[28]. It involved playful-constructive behavior and, different from the classic notions of stroll[28], aimed at interrupting the everyday.

The discourse of locative media recontextualizes the narrative of the drift that always remained open, contingent and shifting.[29] Our work reinterprets the concept of the dérive through a dynamic playground that directs the participants' actions and that, in turn, evolves and changes in response to them. The evolution of the playground is driven by serendipitous encounters of the participants drifting through the urban environment. Inspired by the Situationist concept of "behavioral disorientation"[28], the participants' drift is accompanied by vocal instructions, for example, "take a left here and go east for 2 minutes". Meanwhile, their encounters are tracked, mapped, and put in context with other encounters, with the objective to develop alternative connections. Mapping as a cultural activity here serves as a force of diversification rather than homogenization.

The playground of *Net_Dérive* creates a tension field between actors (participants) in the urban environment and a surveying gallery space. It produces an archaeology of the instant, enabling the surface of the city to be carved and inscribed while these grooves are instantaneously uncovered, contextualized, and displayed. As participants drift through the neighborhood, carving the grooves, the gallery functions as a kind of control center that processes and displays the sonic and visual excavations. Feedback of this central process is sent back to the mobile phones, making the drifters aware of the others' location and revealing the traces they captured from their environs. These traces in form of automatically recorded sounds and images become the building blocks of the excavation site. The recontextualization of excavated artifacts composes a sonic and visual scape of the participants' collective drifting. This composition, in a way, detaches the paths from the 'drifter' and performs its own capability to 'drift'. Present and past merge and intertwine as the mobile participants 'excavate' earlier traces left by previous participants. The city's 'memory' thus materializes as a contact zone at which the dichotomies of present–past and real–virtual meet and interlace, and eventually dissolve.[30] Grooving into the layers of recent history, *dérive* is not only horizontal but also vertical.

Parting Thoughts

We are living in an increasingly mobile culture. As society has the means to be increasingly mobile, what are the real issues in creating a culture of mobility? Commercial offerings simply attempt to transpose existing media, such as television, to portable devices. This passive consumerism is paralleled by current commercial developments that primarily utilize location-sensing features for location-based advertising and services. It appears as if our current mobile media culture not only re-invokes Guy Debord's urban critique but also mirrors the source of this critique, namely the spectacle that turn the individual into a passive consumer.[31]

For the technology journalist Howard Rheingold, today's most important critical question is whether "entire populations of city-dwellers [will] create, use, and exchange information and media associated with geographic locations", or whether we will "be passive consumers of pre-packaged content fabricated by a few dozen synthetic superstars".[32] We could already witness unexpected usage emerging in a grassroots fashion to have cultural impact, for example the explosion of SMS leading to new linguistic vernaculars and spellings. The project presented here offers a glimpse at how we can leverage these forces to create deeper cultural experiences for a mobile society. With Net_Dérive we created a musical locative work.

Market-driven products rarely fulfill the true creative potential of a medium. The commercial offerings in mobile music are no exception. We have the possibility from the point of view of fundamental research, to take an alternative angle to tackle these problems. By building systems as artworks, we gain insight often overlooked in the rush of product development. By injecting creativity into the research process allows us to better understand the creative potential of mobile media.

Creating working prototypes for such ideas are an act of system building. We created an architecture of itinerant devices connected over wireless infrastructures, utilizing network level services such as localization, to feed a dynamic audio-visual content generation process. With all this, the primacy still resided in thinking about what the resulting music sounded like and what the ultimate experience would be for the listener. Composing for such an environment is to look at the system as a kind of instrument, a musical instrument that is not an acoustic network of vibrating elements and air impulses, but a human/technological network of entities and elements coming into musical interaction.

Notes

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