

**Dérive en Mille Sons "*Drifting in a Thousand Sounds*"
a psychogeographic approach to mobile music & mediated interaction**

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Abstract

"Dérive en Mille Sons" is a musical work that uses mobile media technology to artistically examine the relationship between music and the listener. Contemporary media technologies, be they at work, home, or in your pocket, emphasize playback. These devices are designed to facilitate the storage and retrieval of pre-made media assets. This work leverages the processing capabilities that rest dormant within these technologies. Drawing from the writings of Guy Debord and the Situationist/Surrealist practice of the *dérive*, "drifting" becomes a metaphor for instrumental performance in which the openness and emergence of interactivity is articulated through sound, as music.

1: Introduction

The conceptual framework for "Dérive en Mille Sons" has, until recently, been a latent component in my musical work and writings on music and mediated interaction. The project discussed in this paper looks simultaneously to the past and the future. Every work I have completed to date has (unknowingly) been influenced by this thinking and it is likely that I will build on these ideas for years to come. Much thanks is owed to Henry Jenkins, whose essay "Game Design as Narrative Architecture" [2002] helped clarify a direction in the research for this paper. I am also grateful to my colleagues and supervisors in the Planetary Collegium for challenging me to critically examine every aspect of my artistic process. A reflexive critique led me to understand that what was once dismissed as intuition can be traced to a body of knowledge that deserves much deeper inquiry. A discussion of Sonification, and a more thorough exploration of Lefebvre, de Certeau, and Deleuze are absent but will be required in the future as part of a complete, theoretical examination of my work.

For the present, this paper represents a beginning where theories of space and sound are linked with music and mediated interaction. The research has, so far, produced a prototype work. I intend to augment what I have done with the development of two new musical pieces for the Apple iPhone—one that emphasizes the device's three-axis accelerometer and another that emphasizes its telematic capabilities. The practical and theoretical aspects of this work will continue in tandem, moving towards an understanding of the emergent dynamics of mediated, interactive exchange and their potential role in the construction of musical sound.

2: Processing vs. Storage

In the work that I do, one primary objective has been to make contributions that are appropriate given the environment where the work will be received or experienced. This consideration goes beyond wanting something to "fit in." It is more deeply concerned with acknowledging the inherent strengths and weaknesses of an environment or technology platform, and using these either as assets or limitations that serve the interests of the entire work. This approach could be broadly character-

ized as "sustainability" or "ecology." Jane Jacobs, writing on the topic of urban planning, discusses the need to understand inherent qualities and behaviors of a city before one can begin to improve its design. In fact, much of Jacob's book "The Death and Life of Great American Cities" [2000] is devoted to the topic of healthy neighborhoods and how their sustaining order is the best source to consider when planning new or revitalizing old urban spaces.

Brian Eno is an important musical innovator in this regard. While much of his Ambient work is celebrated for its sonic beauty and freshness, value in the conceptual elements behind the work can be overlooked. One of the first Ambient records was "Music for Airports." Eno has commented how this music was the result of cultural and artistic circumstances. He reflects on a trend from the early 1970s in which people played recorded music to create a mood, and that he and his friends were sharing cassettes of still, relatively homogenous music that could be treated as an aural backdrop or surrounding [Eno 1996]. Of course this was not a new idea. Muzak had been doing this sort of thing since the 1930s [Lanza 2004] and "elevator music" was well-established in the public sphere. This was part of his critique. Though the limpid strings and saccharine melodies of Muzak was generally considered to be unfulfilling by many listeners, Eno found something curious in the *function* of Muzak. He considered the possibility that environmental or mood music could actually have something of substance to offer the listener, and in it would be the opportunity to "...induce calm and a space to think" [Eno 1996].

This approach can also be found with Eno's CD, "Thursday Afternoon." Here, a confluence of musical and technical matters led to a work uniquely suited to its medium. The recorded piece is 61 minutes long, which at the time was only possible on compact disc [Eno 1985]. Also, because a CD is digital and has no surface noise, "Thursday Afternoon" features passages that are quiet and musically sparse [Ibid.]. In this work the conceptual and musical aspects are entangled with each serving the interests of the other.

Chris Crawford has also written on the artistic potential of creative and technical synergy. In "The Art of Computer Game Design" he discusses six precepts to help game designers perfect their art by understanding the strengths and weaknesses of their medium. Crawford asserts that computers are far more useful for processing information than for simply storing it. Consequently, his fifth precept is "store less and process more" [Crawford 1982]. Computer games derive much of their artistic merit from responsiveness and interactivity, and information *processing* is essential in facilitating these behaviors. Because computers are natural number-crunchers, game programs can be written to exploit this fundamental strength, which makes *computer* games different from the kinds of games that preceded them. The computer can be told to respond to a choice made by the player and offer a new set of choices. As those choices multiply and begin to represent consequences from myriad prior interactions the player is confronted with a spectrum of possibilities, each with its own unique outcome and potential for further exploration. This kind of interactivity is only sustainable through processing. A computer program that is limited to re-presentation of canned assets will be, by comparison, very limited in its output.

Crawford's observations and lessons should not be limited to game design. Much (if not all) of the digital technology used by contemporary artists and musicians has the ability to process and facilitate interaction between computer systems, individuals, and entire networks of online participants. Once processing has enabled robust interaction, emergence comes to characterize the overall behavior of the system.

3: Emergence

Emergence is a fundamental behavior of interactive systems. Scientific knowledge understands emergence as complex, ordered behavior that is initiated under random conditions and arises from local, non-linear interactions. Emergent behavior is generated through "bottom-up" processes rather than by "top-down," hierarchical control [Johnson 2001]. In contemporary digital art works, emergence arises from a variety of sources, "ordering itself from a multiplicity of chaotic interactions" [Ascott 2003]. Rules are initially set and coded but after some time, a myriad of new uses and creations springs forth as people turn the system to their own ends. Investigation into *Slashdot* [5] [Johnson 2001], *The Sims* and *Spore* by Will Wright [Pearce 2002], and the A-Life artwork of Jon McCormack [2009] will show ways in which emergence is not only a behavior, but essential to the communication of each interactive system.

Musical emergence can be heard in free improv, especially the strain that grew out of London, England and took root throughout Europe in the early 1960s [Bailey 1992]. This style of improvised music exhibits emergence throughout a performance, and is sustained primarily through the training, experience, and musical sensibilities of each player rather than a written score. Experimental music also provides a good model for musical emergence. Pieces like "In C" by Terry Riley are an excellent example of how "bottom-up" processes can lead to diverse and unexpected musical results. For this work there is a simple score with directions. Performers are asked to play through a series of repeated melodic figures while listening to other members of the ensemble to ensure that everyone maintains a similar pace. The result is a seething texture of sound that offers listeners unexpected changes in melody, texture, and intensity with every performance.

Generative music is also reliant on emergent behavior. "Generative" means that the entire musical work is defined as a set of rules or potentialities and usually written out in a computer-readable format. Brian Eno, the musician who coined the term generative music, noted that this musical approach is like making a seed, while the composition of a symphony is like engineering an entire forest [Toop 2001]. The work is not determined at the outset; rather it is allowed to unfold on its own accord in different ways at different times. Eno has been a proponent of these kinds of systems or "machines" throughout his career [Eno 1996]. "Music for Airports" and "Thursday Afternoon" (already discussed here) as well as his recent works "77 Million Paintings," music for the game "Spore," and "Bloom" (also for the iPhone) are all generative works. In each of these there is emergence. While the systems that sustain these works are simple in their organization, melodies, and rhythmic or visual patterns spring forth in different ways to offer a rich experience each time one of these pieces is encountered.

Generative techniques use computers as processors. Michael J. Schumacher's recent "Five Sound Installations" uses a variety of mathematical algorithms to structure melodies and forms [Schumacher 2007]. Brian Eno and the audio team from Maxis used his "Shuffler" technique [Pohflepp 2007] and random number generators [IGDA 2008] to develop the music of "Spore." Like "Thursday Afternoon," these are works that recognize the capabilities of their host system and leverage those toward a musical end. Musical works have more to offer listeners when their features are highlighted by, or mesh with, the inherent technical character of their playback platform. "Dérive en Mille Sons" was made in this mold, but with the additional dimension that it be receptive to the kinds of interaction made possible with the iPhone. Certainly this device can play digital recordings, but it is programmed to play media files in a linear fashion—start to finish, a selection from the middle, and so on. This arrangement is not responsive to the ebb and flow of interactive exchange. A Generative approach uses the processing strength of the iPhone to create unique musical permutations on each listening, and is essential to complement the unpredictable dynamics of interaction. With an emergent, adaptable music "engine" in place, interaction can be structured around metaphors that encourage open-ended exploration and discovery.

4: Psychogeography & Rhythmanalysis

This project draws its name and interaction model from the "Theory of the Dérive" [1958] by writer and Situationist, Guy Debord. The act of moving through actual, geographically locatable places can be usefully characterized by the Surrealist and Situationist practice of the *dérive*. Debord described the *dérive* as, "a technique of rapid passage through varied ambiances," involving "...playful-constructive behavior and awareness of psychogeographical effects..." [Ibid.]. In a *dérive* (which translates as *drift*), movement through and across urban environments has an effect on the emotions and behaviors of the drift-er. Debord writes that differing ambiances from street to street can divide a city into zones. To *dérive* is to walk in a city while attending to psychogeographical preferences. There is no predefined path and no specific destination. The drift-er follows a path constructed by their valence of the ambient zones they encounter, moving towards those that appeal and avoiding those that do not. Each zone, created by its perceived psychogeographical character, becomes a unique space within the larger urban environment, and contributes to an overall ecology that can be experienced as one drifts from zone to zone or space to space.

Debord writes clearly about subjectively perceived zones that can divide a city into a kind of psychological mosaic [1955], but there is little that translates directly to a musical work, let alone one that is open to interaction. Within each urban microcosm there are features that either do or do not draw us near. In physical or even virtual space this idea connects easily with storefronts, sidewalks, and other tangible features. It is somewhat abstract to think about psychogeography in an environment that is purely sonic, but this becomes easier to grasp through an understanding of *Rhythmanalysis*. Henri Lefebvre writes that Rhythmanalysis is both a theory and practice that can help one learn about the character of a place or a culture by listening to its rhythms [2004]. Lefebvre describes the work of the rhythm analyst as a kind of listening in which the specific *content* of each sound, while important, is secondary to the

overall interactions of individual sounds. Harmony, dissonance, density, intensity, arrangement, context, frequency and repetition are all vital characteristics. Lefebvre calls on the double meaning of the word *entend*, to show that the rhythm analyst will both "notice" and "understand" [ibid.] sounds that are encountered. To perform a rhythm analysis is to listen to the sounds of a place, to comprehend the layers of meaning they carry, and to use that sonic data to construct an understanding of one's subject. To *dérive* sonic neighborhoods is to drift and *entend*. Listening to the character of each new zone reveals something about the nature of that zone and its contribution to the overall territory.

5: "Dérive en Mille Sons"

This project, drawing from Debord's theory of the *dérive*, introduces spatial-aural interaction with the three-axis accelerometer found in the iPhone. The simple act of tilting the device left to right or forward and back sends input that can redraw ("move") images on the screen. To date this feature has been used to make games ("roll the marble through the maze", "drive a vehicle") and other, more advanced musical applications (see RjDj later in this paper). Tilting interaction is suitable for this project because it is so intuitive. In fact, no practice is required at all. One is only expected to launch the application on the device, plug in their headphones, and begin.

Tilting the iPhone moves the listener through sonic zones. As with psychogeographic zones discovered in the *dérive*, generative sound clusters and musical phrases are organized into adjacent spaces. Tilting the device in the direction of a sonic space that draws their curiosity "moves" the listener towards that zone so that it can be heard more clearly. In the process, other sound spaces are left behind rendering them either quiet or silent to make what was once foreground, background, and vice versa.

5.1: Building a Sound Palette

"Dérive en Mille Sons" was initiated as an inquiry into ideas about music and mediated interaction and pursued purely as musical work. Drawing on Debord and the underlying concept of psychogeography *space* was always a central concern. I was interested to explore space conceptually as a means of structuring music around interaction. But I was also interested in the sonic aspects of space. *Eigentone*, the sound created by the natural resonance of a room or space [Sonnenschein 2001], or "key-note sounds" as defined by R. Murray Schafer [1977] were guiding concepts. I constructed a palette of field recordings that were made while traveling in Minnesota and Wisconsin (USA) and Cairo, Egypt. When making these recordings I was primarily interested in capturing the sound of environments that struck me as unique: ponds, lakes, residential neighborhoods, cafes, and mosques, for instance. After the recordings were complete, each was edited and digitally processed to emphasize its most compelling, spatially-derived qualities. In the final generative piece, these sounds were layered with additional synthesized sounds to create a collection of sonic zones comprised of the real, the processed, and the synthetic.

Individual zones were organized to be sonically unique and cohesive, just as Debord characterized psychogeographic zones. These zones are "representational spaces" [Lefebvre 1991] that speak with an "...an af-

fective kernel or centre..." [Ibid.]. Within every zone, a carefully organized sound palette is subject to the dynamics of a zone-specific generative system. Each system plays through the sounds in its palette according to pre-determined rules. This produces unique combinations and permutations and lends each space a distinct quality. Thinking beyond the traits of individual spaces or zones it was additionally important to think about their arrangement within the overall territory. The value of the *dérive* lies not only in the qualities of an individual zone but in the interplay at their edges, and the cumulative affect produced when moving through one after another after another after another... Of course, in actual cities, the arrangement of zones is emergent—the result of governmental, geographic, social, and cultural concerns that have come to bear over years of time. "Dérive en Mille Sons" cannot currently support this kind of behavior. It was composed as a musical *dérive* to acknowledge the opportunities for surprise and discovery that can be found through a compelling succession and layering of sounds. However, this sort of emergence is a consideration for future variations of the piece.

5.2: Sound, Legibility & Interaction

When designing space to be part of a musical work, a musician temporarily assumes the role of urban planner. Questioning space, and how it can be used to serve the broad interests of diverse groups is a good place to start. In his book, "The Image of the City" Kevin Lynch [1960] builds a strong case to show how thoughtful planning can make cities more amenable. The city "...must be plastic to the perceptual habits of thousands of citizens, open-ended to change of function and meaning, receptive to the formation of new imagery. It must invite its viewers to explore the world" [Ibid.]. When uses and the use of a city are apparent, citizens have a clear entry—not only to live but to thrive and to find personally fulfilling paths for work, play, and family. Lynch asserts that uses are made evident through their "legibility" in the cityscape. Just as one finds a book legible and can comprehend thoughts and ideas, the potential of a city should be equally clear [Ibid.]. When first choosing sounds, and then organizing those sounds into legible, spatialized groups, the musician is engaged in the kind of work espoused by Lynch for urban environments, where potentiality is a key ingredient in building a system that can withstand myriad interactions and always have something new to offer.

This *dérive* is completely aural in nature. From a musical perspective it grants the listener a much greater deal of autonomy because they are no longer a passive receptor. "Drifting" interaction allows the listener to share an active role akin to a performer or composer, where the music they hear is, for the most part, their own construction. Here, a rhythm-analytic approach to listening is hard to avoid. With no visual reference listening drifters find their ears carefully attuned to the environment as they pass by or through uniquely imprinted sonic zones. In addition, listeners often find themselves in areas where they overlap several adjacent zones. In this situation sounds mix and collide to construct hybrid or composite locations that would be impossible in the streets, neighborhoods, and markets of a city. The physical simplicity of interaction with "Dérive en Mille Sons" adds an additional dimension to the overall experience. Tilting is a natural motion that can be done almost unconsciously. This subtle movement helps overcome potential distraction

with the mechanics of interaction. Listeners can fully immerse themselves in music without the burden of performing awkward keystroke combinations, button presses, and joystick maneuvers.

5.3: Project Prototype

In the summer of 2008 I created a simple prototype for this project. As a computer programming novice I was able to use off-the-shelf software to create a simple yet powerful version of this project. Adobe Flash was sufficient to author a generative music system. To achieve the nuanced, tilting interaction this project demanded I used a Nintendo Wii controller (Wiimote) which has a six-axis accelerometer. To get these elements to communicate, I used the WiiFlash Server developed by Joa Ebert, Thiabault Imbert, and Alan Ross [8] and the WiiFlash Server for Mac developed by Tojio Labs [7]. This proof-of-concept was a success, but it showed me that there were too many individual pieces of software to make the work accessible to a broad audience. As a small computer with media playback capabilities that supports physical interaction via a three-axis accelerometer, the iPhone stands alone as an ideal technical platform to realize this work. These and other features suggest many possible futures for this project as development continues.

6: Future directions

Shortly after writing a formal grant application to help fund this project, I learned about a platform for iPhone called RjDj [4]. RjDj uses physical and sonic input from the iPhone to make music. Pieces, or "scenes" for RjDj are written in Pure Data (PD) [3], a graphical programming environment for real-time sound, video, and graphics processing. RjDj is not a standalone iPhone app. It acts as a host for individual scenes, so to experience music in RjDj, it's necessary to launch the RjDj application and load a specific scene. Collections of RjDj scenes are called an album.

The album "Shake" includes two scenes by artists Matt Robertson and Mike Reed, aka *Moodbungalow* [2], called "Meno" and "Satseauxmann." Both of these involve tilting interaction, revealing RjDj as capable of realizing the interaction mechanism for "Dérive en Mille Sons." As of this writing, the RjDj platform supports all of the proposed functionality for the project and provides a straightforward means of production. It does not, however, offer much room to grow. While the initial project could be a success running on the RjDj platform, it is unknown if RjDj would be able to support new directions in the future.

Initially, the project was started with the intention to become a standalone iPhone app that could be distributed via the Apple iPhone App Store [1]. With funding and assistance this will be possible and looks to be the most sustainable path going forward. As an "official" iPhone app, "Dérive en Mille Sons" could potentially grow in ways that take full advantage of the device's capabilities.

One such direction would be to use A-GPS (Assisted GPS) to enable sonic geotagging. Rather than assign locational metadata to a photograph (as one might do with Flickr [2009]), it would be possible to associate a sound or sounds with a location. This scheme would combine the ideas outlined here with "Sound Garden," a musical installation I completed in 2007 [6]. In Sound Garden, participants access an online interface and "plant" or "prune" MP3 sound files. The garden consists of a generative music system and environmental sensors. The generative

system plays the sound files that have been planted and the environmental sensors control an array of digital signal processors that mix and modulate this audio output. In the project, references to gardening reveal the metaphors for interaction. As one adds or subtracts from the garden, or as local environmental conditions shift, the overall musical output and growth changes and adapts. I can imagine a version of "Dérive en Mille Sons" where sounds are not planted, but used as geotags. This would allow someone to dérive (in the original, Debord-ian sense) with their iPhone so that as they move across sonically tagged physical spaces, "Dérive en Mille Sons" is drawing its source material from sounds left at (or tagged to) their current listening location. In this geographically generative variation, the musical possibilities are determined by the initial properties of the piece, the movements of the listener, and all of the sonic geotags left by those who have gone before them. In an almost warped way, this dérive of geographically specific sounds references R. Murray Schafer's original concept of the soundscape [1977] as a global musical composition for which we are all responsible. This is not an intention of the proposed work, though when viewed through this lens it does reveal further variations that are potentially artistic, political, and ludic in nature.

7: Conclusion

"Dérive en Mille Sons" uses mobile media technology to artistically examine the relationship between music and the listener. It is both a musical work and an investigation of contemporary media technologies. Devices that emphasize playback and the storage of pre-made media assets fail to fully leverage the processing capabilities that make these technologies ripe with opportunity. The Apple iPhone is such a technology. The potential for works that deal with sound, music, and physical interaction is enormous. Guy Debord has written on psychogeography and the practice of the dérive. These ideas can serve as useful metaphors for mediated interaction, while urban planning provides a new model to consider for the organization and arrangement of sonic material. Sounds that are encountered in space—be it geographic, virtual, or conceptual—carry meaning. When attended properly, the relationship of sounds within a given space and the contrast of sounds across adjacent spaces communicate to listeners. With the additional ability to navigate these spaces, the arrangement between listener and music becomes something new altogether.

7.1: Emergent music

Where *effect* is a result, *emergence* is a behavior. The patterns of a cellular automata or swarm algorithm are visually evident as an effect—or result—of a simple rule set.

Where *affect* is a condition that produces emotion, *Amurgence* is a phenomenon of consciousness. This term characterizes emergent behavior with an additional, psychological dimension.

Amurgence refers to behavior that can be witnessed and read. In our mediated world emergence is a given, but through further observation (to *entend* in the Lefebvre-ian sense of noticing and understanding) we find amurgence. It reveals subjective details of the emergent behavior that surrounds us.

"Dérive en Mille Sons" is a work of Amergent music. It is rooted in a study of the innate dynamics of a media technology. The musical work must understand and recognize the functioning order of the environment or platform that supports it. In terms of the "content" or "subject" of the work, that which is to be communicated or explored (via mediated interaction) is organized into sonic spaces, each of which is subject to change. This arrangement works to represent degrees of potential or possibility. Nothing is black and white. Fluctuations within a space, or novelty that becomes apparent through the layering of several spaces, points to a world characterized by nuance. Kevin Lynch describes buildings, sidewalks, and other urban features as useful for the construction of personal narratives: "a landscape whose every rock tells a story may make difficult the creation of fresh stories" [1960]. Similarly, Amergent music does this for mediated interaction, where use of a system, or choices within that system, manifest a sonic synergy coupling the observer and the observed. The emergence of mediated interaction is made "legible" [ibid.] through sound as music.

8: Cited URLs

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2. Moodbungalow www.moodbungalow.com
3. Pure Data <http://puredata.info>
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