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Locative Media as Sonic Interaction Design: Walking through Placed Sounds

Frauke Behrendt

Abstract

This article proposes a taxonomy of mobile sound (art) with four categories – "musical instruments", "sonifying mobility", "sound platforms" and "placed sounds" – that each present distinct ways of articulating sonic mobility. The category "placed sounds" is explored in more detail by outlining a recently emerged range of locative audio genres, including touristic, historical, educational, musical, and experimental themes as well as fiction and games. This article argues that the concept of "Sonic Interaction Design" is of particular importance in the mobile context where audiences or users are already suffering from visual overload. It discusses how walking is key to the interaction design of placed sound.

Introduction

This article discusses a distinct way of articulating sonic mobility – "placed sounds" in detail – while also outlining three other forms of sonic mobility – "musical instruments", "sonifying mobility", and "sound platforms". The concept of "sonic interaction design" is used to draw out the relevance of "placed sound" activities in the era of ubiquitous mobile phones, smart cities and the "Internet of Things". This contributes to re-dressing the visual focus of most publications on locative media that

do not consider audio, sound or music, as part of their analysis, although they are sometimes mentioned as aspects of certain examples that are discussed (Wilken and Gerard Goggin 2015; Gordon and Silva 2011). This article argues that "sonic interaction design" is of particular importance in the mobile context, where audiences or users are often already suffering from visual overload. Practitioners in the field of "placed sound" or locative audio illustrate how to use sound to convey information and experience. Walking is key to the interaction design of placed sound and this paper playfully argues that "we listen with our legs".

A focus on sound helps us to develop a different perspective towards the design and experience of the media saturated worlds we inhabit, an invitation to listen to this world, and to sonify our interaction designs. This contributes to developing alternatives to the dominant discourse based on the economy of visual attention in our digital world.

Going Back

This article starts by going back a few years in the history of mobile sound and locative art, more specifically to the year 2001. Then, a typical mobile phone featured a monochrome screen, monophonic ringtones and number keys (an example is the bestselling Nokia 3310). GPS existed mainly as standalone devices used by a specialized audience. 2001 was also the year the first iPod was released but iTunes did not exist yet. The fact that I did not own a mobile phone was not that unusual.

2001 was also the year that I attended a performance of Golan Levin's *Dialtones. A Telesymphony* (at Ars Electronica in Linz) where the audience and their ringing mobile phones in a full concert hall turned into the "orchestra" that was "directed" by Levin and his team (using a complex technical setup). Each person's seat number, phone number and monophonic ringtone had been registered in a database, so that groups of mobile phones could be called at the same time and patterns of ringing phones moved across the room. This created a polyphonic mobile music experience where each person's location was part of the performance. It was one example of how artists and designers were working by combining separate devices and technologies such as mobile phones, GPS devices, mobile music devices and servers, to create mobile music and locative art.

A strong interest in mobile and locative art, especially works using audio or sound, has stayed with me ever since, in an ever-changing technological landscape. Today, the often specialized and separate devices and technologies used by previous generations of artworks have merged into "smart" and "feature" phones that are used by a mass audience around the globe, with the associated "app culture". Reflecting the move of mobile/locative sound from "fringe" art institutions and festivals to becoming a key part of popular culture, my research interest has also broadened beyond the arts to include popular culture.

This research interest in mobile media and sound has resulted in an ever-growing collection of examples of mobile and locative sound, both in terms of experiencing them

and in terms of collecting documentation (Fig. 1). The collection comprises a wide range of examples of mobile/locative sound, from student projects and experimental art to design studies and popular mobile phone apps (such as games or guided audio tours for tourists). Some of them have been studied through the use of detailed field work (interviews with artists/designers and audience, observations, autoethnography, video/audio/photo documentation), in conjunction with detailed theoretical analysis, as indicated throughout this article. A larger number have been studied through documentation and the analysis of existing material. This article draws on insight from both, but focusses on examples from the latter category to provide a broad selection of mobile/locative sound.

Fig. 1: A small snapshot of some visual documentation of my archive of mobile sound.

Framework for mobile sound

From the archive of mobile sound mentioned above I developed a taxonomy (or framework) of mobile sound with four categories: “placed sounds”, “sound platforms”, “sonifying mobility” and “musical instruments” (Behrendt 2010). This taxonomy was originally developed for an art context but, as this article demonstrates, it is equally useful for the understanding of mobile music in everyday popular culture, especially as ideas and experiments from art and design often re-appear as “innovations” in contemporary digital culture.

This article briefly introduces the four categories (see Fig. 2), and then discusses “placed sound” in more detail because it is an area of mobile sound that is quite developed, with a large number of both historic and contemporary examples, demonstrated by the emerging sub-genres of locative sound outlined below. The examples used to illustrate each category include a large number of artworks (because my archive holds many of these) but also include some contemporary mobile phone apps that are part of popular culture.

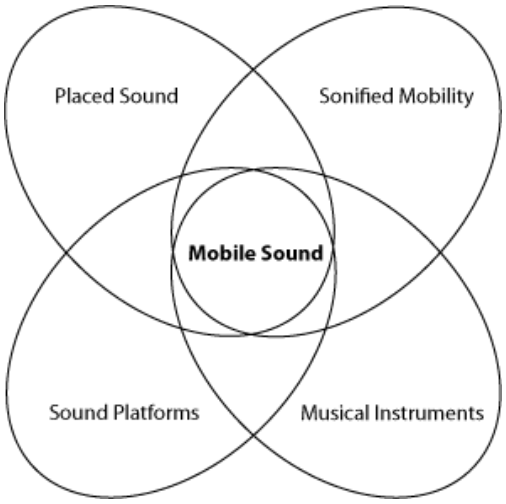

Fig. 2: Framework for Mobile Sound (based on Behrendt 2010).

The category "musical instruments" comprises those works that use mobile devices that were not designed for this purpose. Most commonly, this involves "mis"-using mobile phones as musical instruments. Mobile phones were not designed with the idea in mind that they would be used as musical instruments. However, their sonic features (e.g. ring tones) have been used by artists and designers to turn individual mobile phones or groups of them ("ensembles") for making music. Since mobile phones can feature different kinds of "apps", a significant ecosystem of music apps has emerged for mobile phones. Levin's *Telesymphony* mentioned above would be an early example, and the many musical apps available on today's smartphones illustrate how much these "mobile musical instruments" have become part of everyday culture (Behrendt 2012a).

The second category is "sonified mobility" and describes pieces where audience mobility is "driving" or influencing the sound or music they hear while being on the move

(Behrendt 2014). Recently, sonification of GPS data has been the most common approach in this category but there are many other ways of engaging with sonified mobility. The audience can be mobile in a variety of ways including walking, cycling, driving or using public transport, arguably establishing "mini-genres" that explore the aesthetics, politics and contexts of these specific modes of transport. Examples of "sonified mobility" that feature walking as a key part of the audience interaction include work by Gaye, Symons and Tanaka (Gaye, Mazé, and Holmquist 2003; Tanaka, Tokui, and Momeni 2005; Symons 2014).

"Sound platforms" are the third category of mobile sound (art). Here, artists or designers develop a platform that they provide to members of the public so that they can contribute their own sounds. Typically, the audience are also able to distribute their sounds in space. While the way each platform operates is designed by the artist, the audience populates it with content in terms of sounds and their locations. Works by Shepard, Micaleff et al and Redfern et al are examples (Shepard 2006; O'Donovan 2003; Behrendt 2006; Behrendt 2014). These "sound platforms" often engage with existing communities or groups and share the "locative sound" element with the fourth category.

The category "placed sound" is the fourth one in this taxonomy, and most relevant in the context of this article. Here, artists or designers curate the distribution of sounds in (outdoor) spaces, often – but not exclusively – by using GPS. The audience typically experiences these sounds via headphones and sometimes via mobile phone speakers or other mobile speakers. The audience does not contribute their own sounds or determine

the location of sounds, as in "sound platform" pieces. But each member of the audience creates their own version or remix of a "placed sound" piece, depending on their trajectory.

A key part of "placed sound" experiences is that the audience can only access the located content when they are physically present in the specific geographic location. Their GPS location triggers sound playback. However, some "placed sound" works have an "armchair" mode that allows people to have some of the experience remotely, for example by clicking icons on a digital map to trigger the sounds associated with those locations. It does make part of the experience more widely accessible, for example, to those who are unable or unwilling to travel to the specific location. However, it must always be kept in mind that this "armchair" experience is distinct from the experience *in situ*, in terms of how the complex interplay of physical, digital, social and embodied factors frames the audience's experience. The "armchair modus" could therefore be more likened to documentation of the work, rather than experiencing the mobile sound work itself.

Placed Sound

After this brief overview of the four categories of mobile sound, this article now takes a closer look at the "placed sound" category (also often referred to as locative audio: "placed sound" and "locative audio" are used interchangeably in this article unless otherwise specified) because this is one of the two categories of mobile sound that are

firmly established in today's popular culture. The other popular category is "musical instruments" (as noted above). This article explores the complex relationship with specific locations and the audience's mobility in relation to these locations found in "placed sound" in order to highlight key issues around "audio mobility", the topic of this special issue. The popularity of this category is demonstrated by the fact that, over the last decade, several themes or sub-genres of the "placed sound" category have emerged, including more narrative ones such as historical, touristic, educational, fictional, games, and less narrative ones such as music and experimental sound (see Fig. 3). The examples used to establish and illustrate this genre rely on sound as the primary way of conveying information, but many also use other modalities such as visual information displayed on mobile phones or haptic interaction with a touch screen.

Fig. 3: Genres of Placed Sound / Locative Audio

Probably the most common examples of "placed sound" in everyday culture are to be found in the context of tourist apps and/or apps with a historical theme. Sounds are placed in specific locations of touristic or historical interest and the sounds are often

combined to form trails or walks, in the tradition of the guided tour and themed maps. The key sounds used are narrative vignettes, either in the form of a monologue or read out by various characters. These are sometimes supplemented by background sounds or music, and/or by sound/music sections without narrative. The content of touristic placed sounds are often structured around key sites or around themed walks and sites (e.g. for music or food lovers). There is some overlap between touristic and historical "placed sound", as they are often targeting the same audience or integrated with one another.

Historical "placed sound" focusses on using locative audio to attach sound, music and narrative with content relating to the past, to locations of historical significance. The audience experiences the location overlaid with sounds pertaining to its past. Some locations might have "witnessed" several events of historical significance and therefore several temporal layers can be attached to one location. Many examples of historical "placed sound" focus on one specific period and curate content that fits this period and which has taken place within a given range of a location; often within walking distance. While many works use mainstream historical facts, there are also examples of alterative histories that aim to give "voice" to historical accounts that are traditionally overlooked. There is often a strong narrative element to historical "placed sound" (Bradley 2012) and arguably, some overlap with the "spacialised fiction" genre (however, such examples are typically not closely related to historical facts).

There are also several examples of using "placed sound" for educational purposes, or what I would call locative pedagogy. Some of these might be of a historical character (see above) while others engage in location-based education in all kinds of fields including geography, biology, ecology, etc. and form part of the field of mobile learning (Pachler, Bachmair, and Cook 2010). A typical example might involve students engaged in learning in the field, as users of the apps (the most common current technical incarnation), having to move between specific physical locations to interact with the locative audio. Students are also often found participating in or driving the development of educational "placed sound" applications; developing their media, technical, sonic, team and communication skills.

Another set of "placed sound" examples engages with spatialised fiction. Here, an (existing or new) narrative is set in a group of physical locations (often in close proximity with one another). Janet Cardiff's work is probably the most well-known in this field, but many other artists and designers work with spatialised fiction (Greenspan 2011; Hight 2006; Schäfer and Gendolla 2010; Behrendt 2010, 53) and mobile stories (Farman 2015). Some of these works have historical themes, so there is some overlap with examples of historical "placed sound" but the focus of spatialised fiction is on the relationship between audience, space and narrative, rather than on the historical facts.

Locative audio games make up another genre of placed sound. Sound is a key part of the gaming experience (Collins 2013) and design (Grimshaw, Tan, and Lipscomb), and the same is true of locative games that are also often referred to as Big Games, Pervasive

games, Urban Games, Location-based Mobile Games (LBMGs) or Hybrid Reality Games (HRGs) (de Souza e Silva and Sutko 2009). "Placed sound" locative games focus on the use of sound to create the gaming experience. They draw on the field of sound design for games and especially "audio-mostly" and "audio-only" games. *Run Zombies Run* is probably the most mainstream example of "placed sound" games (although there is some overlap with the "sonified mobility" category, see above). Runners use the app and hear "an action-packed game and story mixed with your own music" through their headphones and can optionally "turn on thrilling zombie chases that force you to speed up to escape the hordes" for a more intense workout (Zombies Run, n.d.). This app represents a sonic example at the intersection of the quantified self, gamification and the use of mobile devices for sports/exercise. The app also has some fictional aspects as part of the sonic gaming experience.

Some examples of placed sound have a musical focus. They place music in specific places and allow the audience to find their own path through these "samples". The walking participant could be likened to the needle of a record player – if we imagine the groove extending to the scale of the streets or the city. One recent example is *National Mall* (Canada et al. 2011) and other locative experiments with the format and concept of the continuously emerging "song" or "album" (Sa Dias 2014).

Experimental works of sound art form the last category of "placed sound". These works experiment with the potential and limits of locative audio in the art context (Behrendt 2010; Behrendt 2012b). They might include aspects of some of the other genres I sketched out above, but are pushing the boundaries in terms of aesthetic and political

engagement with technology, context, audiences and sound. Examples include works by Teri Rueb (2014) and by many of those represented in other contributions to this special edition of *Wi Journal*. Experimental works of "placed sound" are typically presented in the context of arts institutions or events, as well as in research contexts. The ongoing curation, collection and preservation of locative art is a key concern for this often fast-moving field.

All these genres of "placed sound" have in common that they focus on using sound to convey the information and/or to create the experience. With the field of "placed sound" still growing, new genres will emerge to complement or superseed some of those sketched out in this article. Each of these genres has received some academic attention but there are still many relevant issues that warrant future research.

"Sonic Interaction Design" in the Mobile Context

When most people and the press talk about Augmented reality (AR), they have a visual version of this in mind, for example displaying an overlay of visual information onto a live feed from the cell phone camera, or by using glasses (e.g. google). Locative audio or "placed sound" could be considered as the acoustic equivalent of "visual AR". While (realtime) data visualisation has become a key part of contemporary culture, data sonification (Hermann, Hunt, and Neuhoff 2011) has not received as much public attention.

If we consider that today most people engage with digital information via mobile devices, it is likely that we will see more use of sound for mobile interaction design in the future. Many mobile activities, such as walking, cycling or driving make it challenging to interact with visuals on screen and with haptic interfaces. Locative audio, or "placed sound" can be understood as a field of practice that has already accumulated a significant body of knowledge around the use of sound in the mobile and locative context. "Sonified mobility" (see above) will also be an important resource for developing the field. The resonance between being immersed in sound and in other mobile media experiences further highlights the relevance of sound for mobile interaction design (Behrendt 2012c).

"Sonic interaction design" refers to the "practice and inquiry into any of various roles that sound may play in the interaction loop between users and artifacts, services, or environments" and this emerging field is "devoted to the privileged role the auditory channel can assume in exploiting the convergence of computing, communication, and interactive technologies" (Rocchesso et al. 2008, 3969). Discussing locative audio and "placed sound" through the lens of "sonic interaction design" draws out how the locative practices described above illustrate an active focus on sound and interaction. We could argue that they "consider [...] sound as an active medium that can enable novel phenomenological and social experiences with and through interactive technologies," as one of the recent definitions of the field of sonic interaction design states (Franinović and Serafin 2013, vii). Figure 4 aims to visualise the key aspects of "sonic interaction design".

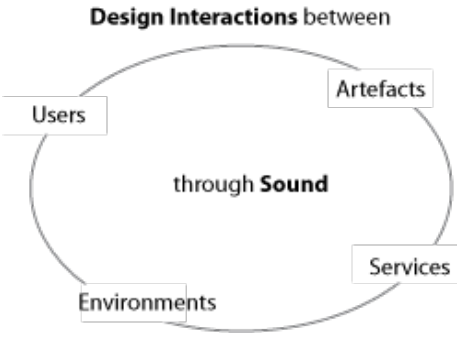

Fig. 4: "Sonic interaction design" (based on Franinović and Serafin 2013; Rocchesso et al. 2008)

As discussed above, with the rise of multimodal smartphones, the mobile and locative context provides the backdrop for both a sustained and a growing field of practice focussed on sound. "Placed sound" works could be understood as locative audio examples of "sonic interaction design", that is, corresponding to: "the creative activity of shaping the relationship between artefacts, services, environments and their users by means of interactive sound" (Franinović and Serafin 2013, vii). These mobile and locative sonic experiments are of growing importance, because visual interfaces are not always well suited to mobile, locative and urban contexts we encounter (Behrendt and Lossius 2011). This becomes even more pronounced with the rise of data from what is often referred to as smart cities and the internet of things (IoT). "Placed sound" and the other types of mobile sound outlined above illustrate how digital data can be displayed to users in auditory ways in the mobile context.

Walking as Sonic Interaction

It is of particular interest with regards to "placed sound" works that a key part of the "sonic interaction design" evolves around the audience's mobility, typically through walking. In "placed sounds", the distribution of sound in space is pre-curated, and users create their own version or remix of the service or art work by choosing their path through the sounds. The sounds and their locations are chosen by the designers of the application and the participants experience – or rather co-create – their own version or remix of the piece, depending on their path and the time spent with the service.

The interaction with "placed sound" works is of course not limited to walking. Some works have also been created for other modes of transport such as public transport, driving or cycling, with interesting approaches to the aesthetics of each mode. However, most placed sound pieces ask the audience to walk – a theme also discussed by others in this special edition of *Wi journal*.

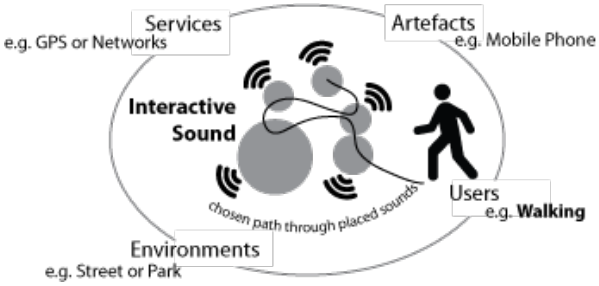

Fig. 5: The role of Walking as Remixing in "placed sound" examples of "sonic interaction design".

The role of walking is of key importance for "placed sound" in terms of interaction design. The choices each participant makes in terms of direction, length of the walk, and time spent in specific locations, determines the participant's experience of the service. Each user creates his or her own version – walking becomes remixing, a mode of interaction. The "sonic interaction design" for "placed sound" is therefore always, by definition, embodied; a design consideration that is not always central to methods of designing visual mobile interactions. The complex sonic interactions of "placed sound" and the importance of the walking user (or audience) is illustrated in figure 5. It is important to bear in mind that textual and visual representations of sonic and mobile experiences are always problematic. However, they also form an important part of analysis in sound studies and media studies.

The role of walking as sonic interaction design in "placed sound" is particularly interesting for non-linear examples. Linear examples try to curate the audience's path by guiding them along a set path, from one location to the next; many touristic or historic "placed sound" apps are examples of this. Non-linear examples do not prescribe a set path to users but allow them to explore the placed sounds through their own chosen paths. A "musical" example (*National Mall*) and an "experimental" example (Teri Rueb's *Core Sample*) will further illustrate how walking operates as "sonic interaction design" in "placed sound".

Users of the *National Mall* (2011, by Bluebrain) download the app, walk around an outdoor park area in Washington DC, and, depending on their location, they can hear specific composed sounds and music that the musicians behind the project have "attached" to these locations. The Bluebrain duo explain the role of walking in relation to sound in the description of their piece: "An album that does not progress in a linear manner, but rather, evolved based on the user's chosen walking path and pace [...]. Musical swells, arrangement shifts, rhythms and melodies all change in accordance with the listener's chosen route within miles of landscape" (Bluebrain 2011b). This means that listeners will each remix their own version of the "music that's been composed and carefully placed throughout" by walking their own individual path through the park (Bluebrain 2011a). *National Mall* illustrates how walking operates as sonic interaction design in a popular culture and musical example of placed sound (Behrendt 2012c).

Core Sample (2007), an "experimental" example of "placed sound", is situated on one of Boston's Harbour Islands that is also National Park and was commissioned by The Institute for Contemporary Art (ICA), Boston. Sounds corresponding to specific historic periods of the island are mapped onto its geographical elevation profile with sounds relating to periods further from the past at sea level, and sounds relating to more recent times mapped to the tops of the hills. Visitors walk the island's path system with a *Core Sample* map where different colors represent the elevation levels and sound zones: "Atmosphere, plantings, top soil/loam, central artery fill, modern landfill, settlement and industry 17th-21st century, native American landfill 500-1580, geologic core" (ICA Boston 2007, 6). These sounds are specifically recorded for the piece and include

atmospheric and experimental sounds as well as narrative fragments from interviews the artist conducted with people connected to the island and its past. The audience are free to choose their own paths through the piece by choosing one of the many possible routes along the island's path system. Each walk is a unique combination of the island's soundscape at that moment and the *Core Sample* sounds on their headphones, co-created by the pace and locational pattern of walking. Walking and listening are not only key aspects of sonic interaction design for "placed sound", they are also two powerful modes of connecting us to our surroundings – and show how mobile media can be part of this process of connection, rather than isolating or alienating us from them (Behrendt 2012b).

Conclusion

To conclude, this article returns to the importance of walking as interaction for locative audio by drawing on a conversation between Maturana and von Förster that went something like this: "We see with our legs", followed by the question "why?". The answer is: "Walk! See – everything looks different now, doesn't it?" (von Förster 1995). If we take this visual quote and put it in the sonic realm, we could argue that "we listen with our legs" – to understand why, just start walking – "see, everything sounds different now, doesn't it?".

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Biography

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