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Chamberlain, Alan and Bødker, Mads and Hazzard, Adrian and Benford, Steve (2016) Audio in place: media, mobility & HCI: creating meaning in space. In: 18th International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI 2016), 6-9 September 2016, Florence, Italy. (In Press)

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# Audio in *Place*: Media, Mobility & HCI - Creating Meaning In *Space*

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**Abstract**

Audio-based content, location and mobile technologies can offer a multitude of interactional possibilities when combined in innovative and creative ways. It is important not to underestimate impact of the interplay between location, place and sound. Even if intangible and ephemeral, sounds impact upon the way in which we experience the built as well as the natural world. As technology offer us the opportunity to augment and access the world, mobile technologies offer us the opportunity to interact while moving though the world. They are technologies that can mediate, provide and locate experience in the world. Vision, and to some extent the tactile senses have been dominant modalities discussed in experiential terms within HCI. This workshop suggests that there is a need to better understand how sound can be used for shaping and augmenting the experiential qualities of places through mobile computing.

**Author Keywords**

Audio; Mobile; HCI; Music; Sound; Sonic; Place; Semantic; Software; Evaluation; Location; Design.

**ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

There has been little chance for researchers to come together in order to explore mobile technologies, soundscape design, and issues around place and locality in a meaningful way. This paper offers a small insight into some of the existing systems and methods that have been developed, in order to inform the research community about the developing field and to provide a platform for future discussion and reflection. We consider existing systems, which have their own set of individual features, describe some issues in the research area, and move on to provide a set of workshop goals and finally conclude.

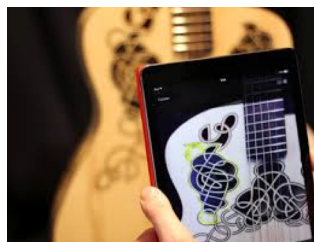


Fig. 1. Interacting with the Carolan guitar

### Scoping the Sound 'Scene'

"There is probably no other human cultural activity which is so all-pervasive and which reaches into, shapes and often controls so much of human behaviour" [1, p. 218]. Merriam [1] was, naturally discussing music, possibly the most ubiquitous of media. It forms a core element of our everyday practices and experiences. Music is embedded in our media soundtracks; it accompanies our journeys; populates our work environments; drives our exercise routines; shapes our shopping experiences; and frames much of our personal, social, cultural and religious identities. Contextual listening [2] describes how humans form connections, references, and associations between music and other extra-musical concepts, objects, places, times, memories and nostalgia; a desire for something that feels lost in time. While memories *are* lost in time, they have roots affixed to places and practices. Imagining new connections between digital media and archives of digital content such as sounds and music might be a means with which to 're-enchant' urban or rural sites and the space that exists between such classifications.

More recently there has been a focus on the mobile interactional possibilities with artefacts such as the Carolan guitar [3] by using bespoke codes embodied within the physical construction of the instrument, (accessible by an app – scanning different parts of the guitar can give the user different insights into the history of the instrument, see Fig. 1.) has allowed players, researchers and designers to come together and understand the way that an instrument which spans the digital and the physical can collect it's own history, and the way that this might be curated by a custodian of the instrument in order to bring different

meanings and perspectives to bear. Introducing sound into spaces has been a rich field of artistic and research endeavor encompassing a broad range of realisations. Some exploit mobility, others are site specific, some are personal experiences as listened to on a mobile device with headphones, whereas others are social, tangible objects and interactive affordances placed into a space. We now present a few examples that speak to this range. Hazzard et al. [4][5] has developed a set of guidelines to support the composition of interactive musical soundtracks for locative experiences; drawing motivation from embodied cognition and psychomusicology to reveal some relationships between *musical structure* and *spatial experience*. *Musical structure* refers to the principle features of western tonal music, such as melody, harmony, rhythm, timbre and dynamics, whereas *spatial experience* is focused on those semi-orchestrated walking experiences such as cultural visiting, urban and tourist walks and mobile games; activities that are typically site specific, where participants move in and out of engagement with points of interest or artefacts situated within the location. The work considered Schmidt et al.'s [6] model for context-awareness, which proposes two high-level factors – the *physical environment* (i.e., the conditions, infrastructure and location) and *human factors* (i.e., the user, social environment and task). The resultant compositional guidelines propose a two-tiered approach to mapping musical features against locative experience, namely *musical landscapes* and *musical trajectories through points of interest*. These guidelines were used in the composition and authoring of a large-scale interactive soundtrack for Yorkshire Sculpture Park in the United Kingdom – a large cultural visiting experience that houses numerous contemporary sculptures exhibits set in varied parkland. *Musical*

### AudioCubes - Findings

Some initial findings from the AudioCubes' sessions indicate that manipulating the cubes and the 'aural affordances' mapped out on them (i.e. associating the faces on the cubes with different soundscapes) allow participants to discuss, imagine and narrate connections between soundscapes, places and personal as well as interpersonal experience. For instance, by layering different sounds, informal stories about pleasant vs. unpleasant soundscapes, past experiences with sounds, social similarities in soundscape perception, musical qualities (rhythm, pitch, timbre) of environmental sounds, curiosity and 'close listening' practices, as well as questions about skill and serendipity associated with creating pleasing and evocative soundscapes arose.

landscapes referred to the high-level structure of the soundtrack, such as its sections, which were mapped against the physical structure of the park. This meant that authored trigger zones for instigating playback of musical fragments were drawn along key transition points in the space, such as walkways, changes in environment, or around those areas that house points of interest (e.g., sculptures). This created a map of musical regions (see Fig. 2.) where each presents a different, but complimentary musical treatment. A user's transition from one physical area into another is greeted with a harmonious modulation of key and the introduction of new musical themes. The *musical trajectories through points of interest* concern a lower-level of musical detail, which describes how the music should accompany visitors in, through and out of engagement with points of interest (e.g., sculpture exhibits) situated within the regions. This four-phase trajectory accompanies visitors as they *approach* a sculpture (the music builds up its intensity), *arrive* in close proximity to it (a climax and resolution of the music), *engage* with it at close quarters (a low level of musical intensity, leaving space for engagement) and then *departure* (a different variation of the *approach* phase without the rising contour of intensity)(see Fig. 2). These two compositional methods resulted in a soundtrack that responded elegantly to both the location and the activity taking place within the location. Visitors who experienced this musically accompanied exploration of the sculpture park – via an iPhone and headphones – reported a uniquely engaging and emotive experience quite distinct to a typical non-musically accompanied experience. The interactive soundtrack promoted feelings of comfort, accompanied solitude, abatement, increased focus, enhancement and serendipity. This soundtrack added an additional layer

of meaning onto the visiting experience that reframed their interpretation and behaviours within the space. Additionally, the music acted as a container of the experience, indicating to visitors when they were active in the experience (soundtrack sounding) or disengaged from the experience (soundtrack silent).

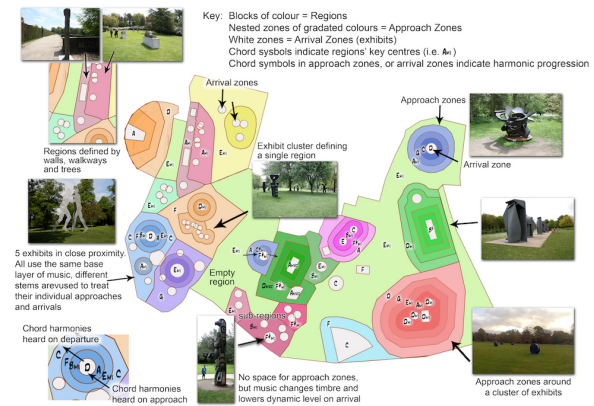


Fig. 2. Map of Musical Landscapes

We now consider an example of more tangible and social musical experience in place, that of using AudioCubes (see Fig. 3)

AudioCubes (built by Percussa.com) are white acrylate cubes with built in dynamic LED's (allowing colour change as feedback) and wireless connection to a computer. IR-sensors built into the cubes allows the audience to easily manipulate and explore the soundscapes, for instance by reaching out for a cube, or turning cubes to face each other. In previous work, the AudioCubes has been used for the installation "Resonant Tourism". This piece exhibits a number of urban and rural soundscapes recorded in Mid/Side



Fig. 3. AudioCubes allow tangible explorations of sound.

Stereo configuration, a recording technique that enables a very 'wide' or dimensional acoustic space. Rather than using a standard sound mixing console to simply turn volumes up and down, the AudioCubes provides a slightly mysterious, but at the same time intuitively tactile and explorative interface to audience engagement with soundscapes.

### Outcomes and Conclusions

We have shown some of the existing systems that combine audio, mobile technologies and location/place in order to create a range of different experiences for people, and by reflecting upon this is has enabled us to better understand the issues that are associated with such work. This extended abstract also outlines the goals for our workshop and in doing so provides a document that will be used to inform participants and enable the workshop to have a grounding in the ongoing research in this area. In the workshop, we wish to extend and deepen the collaboration between researchers who are working with place design, mobility and sound. Some themes that we see emerging from the discussion and collaboration at the workshop include;

- *Meaning and Mediation*; how do people narrate or make sense of places and movement augmented with sound
- *Mobility and Immobility*; how does sound impact movement, what are the dynamics of sound in places with movement and in places of rest or idleness?
- *Locating Content and Spatialisation*; how are sounds located, how do sounds become part of the spatial fabric

### Acknowledgements

This research was supported through the following EPSRC projects: Fusing Semantic and Audio Technologies for Intelligent Music Production and Consumption (EP/L019981/1); Living with Digital Ubiquity (EP/M000877/1). We would also like to acknowledge the PDTN – Social and Cultural Innovation Group.

- *Personalization and Reflection*; how can people use sounds to narrate and reflect on their own experiences?
- *Methods and Approaches for Understanding Interplay*
- *Sonic Augmentation*; how can sound change the experiential attributes of places, e.g. make them more accessible, more playful?

These are some tentative implications and questions that we expect to address in future work.

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