

Minimal Attention Navigation via Adapted Music

Rachael Hunt, Mark Apperley, Sally Jo
Cunningham & Bill Rogers
University of Waikato, NZ
{rmh14}@cs.waikato.ac.nz

Matt Jones
FIT Lab, Computer Science Department
University of Wales, Swansea, UK
always@acm.org

ABSTRACT

Navigating using subtle cues from the audio track you are listening to may make your journey as enjoyable as the destination. In this project, we are investigating enjoyable ways of providing pedestrians with navigation support, specifically by allowing them to navigate to music.

Author Keywords

Mobile navigation, audio cues, minimal attention.

ACM Classification Keywords

H5.2. User Interfaces.

INTRODUCTION

Many of the navigation aides available to pedestrians require their full attention; for example, to use a map you must stop and study it closely, reducing engagement with the surroundings. Walking with a guide is much better — you pay almost no attention to the task of navigation, but are still directed to your destination. Audio-based interfaces have some of these advantages; specifically, they leave the visual sense unimpaired.

Currently, systems have been developed using three audio approaches: spoken cues, audio icons (non-speech cues), and adapted stereo signals. Kray *et al.* [2], for example, included natural language instructions when investigating the presentation of route instructions to the mobile user. This type of cue is quite easy to interpret, but intrusive. Another approach, taken in the AudioGPS system [1], uses audio icons and stereo panning to convey location. However, both systems occupy the user's audio sense.

Many people like to listen to music while they walk. In earlier work [5] we proposed adapting the spatial balance of the user's music. The potential of this idea was confirmed by Strachan *et al.* [4] in their GpsTunes system.

Our work focuses on further investigating just such minimal attention audio user interfaces [3]. There are a range of alternatives for adapting music. How much alteration (of favored music) will listeners allow? Does the type of navigation cue affect the user's mental load? Will this type of subtle navigation system be as effective as other more traditional navigation aides? What type of direction do users prefer, and which is the most efficient? Do the user's objectives alter the style of guidance that they require?

WORK TO DATE

An initial experiment was carried out to measure the cognitive burden of different cue types. We compared speech cues, audio icons, and adapted stereo against walking with a friend. Users listened to a spoken audio track while navigating, engaging them and leaving navigation as a secondary (low attention) activity. Cognitive burden was measured by evaluating users' memory of the audio track, and through questionnaires.

The eight users completed 8 tracks each (2 using each cue system), giving data for a combined total of 640 navigation events. Disappointingly, we did not discover any difference in cognitive burden. All systems were found to be usable and workable for navigating. In particular, stereo adapted audio was as effective as the other systems. Encouragingly, stereo alteration ranked highest of all in user preference.

ONGOING WORK

The next step is to further investigate adapted music navigation cues. When listening to a music track of choice, what types of cues are noticeable, and do they affect the listening experience?

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BIOGRAPHY

Rachael Hunt is a PhD student studying Human Computer Interaction at the University of Waikato.

Mark Apperley is Professor of Computer Science at the University of Waikato. His research is human-computer interaction, with a recent focus on sketch-based and informal techniques.

Dr. Sally Jo Cunningham is a Senior Lecturer of Computer Science at the University of Waikato. Her interests include music retrieval, digital libraries, and usability.

Bill Rogers is a Senior Lecturer of Computer Science at the University of Waikato. His interests are in HCI, large interactive displays, and pen-based computing.

Dr. Matt Jones is a Senior Lecturer at the University of Wales. He is interested in using computer science to understand and improve the human experience of mobile and ubiquitous computing.