J Multimodal User Interfaces (2012) 5:85–86
DOI 10.1007/s12193-012-0095-7

EDITORIAL

Interactive sonification

Roberto Bresin · Thomas Hermann · Andy Hunt

Published online: 20 April 2012

In October 2010, Roberto Bresin, Thomas Hermann and Andy Hunt launched a call for papers for a special issue on Interactive Sonification of the Journal on Multimodal User Interfaces (JMUI). The call was published in eight major mailing lists in the field of Sound and Music Computing and on related websites. Twenty manuscripts were submitted for review, and eleven of them have been accepted for publication after further improvements. Three of the papers are further developments of works presented at ISon 2010—Interactive Sonification workshop. Most of the papers went through a three-stage review process.

The papers give an interesting overview of the field of Interactive Sonification as it is today. Their topics include the sonification of data exploration and of motion, a new sound synthesis model suitable for interactive sonification applications, a study on perception in the everyday periphery of attention, and the proposal of a conceptual framework for interactive sonification.

R. Bresin (✉)
KTH Royal Institute of Technology, Stockholm, Sweden
e-mail: roberto@kth.se

T. Hermann
Ambient Intelligence Group, CITEC, Bielefeld University, Bielefeld, Germany
e-mail: thermann@techfak.uni-bielefeld.de

A. Hunt
Department Electronics, University of York Heslington, York YO10 5DD, UK
e-mail: andy.hunt@york.ac.uk

1 Data exploration

This is the traditional topic of Interactive Sonification, and is reflected by the number of papers in this category, five out of eleven. In an interesting study Grond and Hermann apply voice synthesis (vowel sounds) for the sonification of mathematical functions. In another work, Ferguson and co-authors discuss the interaction design for multi-touch computing for exploring and interacting with representations of time-series data simultaneously in both the visual and auditory modalities. Metatla and co-workers focus on data exploration, and present an approach to designing hierarchy-based sonification for supporting non-visual interaction with relational diagrams. In another study Ness and colleagues propose the use of a multimodal tangible interface that allows the users to explore data in both time and space dimensions while receiving immediate sonic feedback of their actions. This interface is applied to phenology, the study of periodic biological processes, and can be used to explore the effects of climate change. Sonification of the environment for delivering location-based information to mobile users is the challenge faced by El-Shimy and collaborators in their research work. They propose a system that allows for increased awareness of the environment for users with limited vision capabilities or whose visual attention is otherwise occupied in other tasks.

2 Motion

One of the papers which presents a follow-up study of work presented at ISon 2010 is the work by Dubus in which he presents an evaluation of four sound models for the sonification of elite rowing. The sonified data were those of the movement (speed and acceleration) of a single scull rowing

boat. Results show a good ability of athletes to efficiently extract basic characteristics of the sonified data, and highlight the important issue of aesthetics in interactive sonification design. In another paper dedicated to motion, Varni and colleagues present three interactive sonification models of the synchronisation of gestures between two people each shaking a mobile phone. Interactive sonification of their hand movements helped users to keep synchronised with each other. In a study on the sonification of everyday actions, e.g., pressing a button on an ATM machine, Susini and coworkers found that the level of usability (low vs. high) of the user interface affects the choice of sounds that best deliver a sense of naturalness of the interaction.

3 Sound synthesis

The representation of continuous processes in interaction and interface design often uses liquid metaphors, such as dripping or streaming of fluids. In an original work Drioli and Rocchesso present a physics-based sound synthesis model of liquid phenomena suitable for interactive sonification of this class of processes.

4 Perception

In a follow-up study of their work presented at ISon 2010 Bakker and colleagues present a qualitative study on the everyday periphery of attention. They found that sound plays a major role, supporting their approach to use interactive sonification as an interaction style for peripheral interaction.

5 Conceptual framework

In a further development of their study presented at ISon 2010, Diniz and co-authors present in more detail their theoretical foundations combining gestalt-based electroacoustic composition techniques, user body-centred spatial exploration and mediation technology for the definition of a conceptual framework for interactive sonification.

6 Concluding comments

The diversity of topics brought together in this special issue demonstrates the richness and interdisciplinary of research in Interactive Sonification. The guest editors hope that the articles will provide inspiration and trigger new cross-discipline ideas.