

Do the Buzzer Shake

Gerard Roma¹, Anna Xambo², and Jason Freeman²

¹ CVSSP, University of Surrey. Guildford, United Kingdom

g.roma@surrey.ac.uk

² Center for Music Technology, Georgia Institute of Technology, Atlanta, Georgia USA

anna.xambo@coa.gatech.edu

jason.freeman@gatech.edu

Abstract. This performance explores a setting where the music is entirely created by the audience using their mobile phones, and there are no predefined hierarchies beyond the proposed interface. The piece is specified as a number of mobile accelerometer gestures that are recognized in a web application. Each gesture triggers a recognizable sound. The main interest is to study the social diffusion of the discovery process.

Keywords: audience participation, gesture sonification

Introduction

A long tradition exists for music based on gestures using sensors. However, for most of this time digital sensors were only available to specialists. The popularization of smartphones and the easy deployment of web technologies have created an opportunity for the emergence of gesture languages for music. This piece explores social learning of gestures in a musical context using web audio. The audience is asked to connect their smartphone to a web location. The web page will start producing sounds in each user's phone. They are then asked to search for gestures that will produce identifiable sonic patterns. An example is given. The central part of the piece is then a dictionary that maps gestures to sonic patterns, and a machine learning system for detecting gestures using accelerometer signals. Everything is executed in the browser. The performance investigates how the discovery is learnt and propagated in a social setting.

Technology

The software is implemented using web standards. A neural network has been trained to recognize a set of gestures using mobile accelerometer sensors. A training interface is used by the authors to record accelerometer data and train a classifier. In preliminary evaluation, the system has been evaluated using 2-second frames and 5 basic gesture classes, achieving 87% accuracy. The classifier is then loaded in a mobile browser using javascript to recognize the gestures in real time. In real-world usage, we have found it is really easy to get the system recognize the basic gestures. In initial trials they have generally been discovered by participants without showing them. Gestures trigger simple sounds synthesized using the Web Audio API. Loud square waves are used to maximize the volume when using mobile phone speakers. In initial tests, the technical requirements for smartphones can be reduced to having a recent Webkit browser (Chrome or Safari), which includes most recent phones.

Rules and design

The piece depends on audience engagement and the acoustics of mobile phone speakers. A base sound is used for general synchronization, and basic instructions are given through projection. The main objective is to encourage the discovery of new sonic patterns. An example gesture is initially shown. The following rules have been given to participants in initial trials:

- Please don't talk or laugh
- Turn volume up
- Do not allow the phone to lock the screen
- Tap on "START" and wait for the page to display the message "Touch to start"
- Wait for a signal from us to start
- Practice the first example for a bit and try to discover new gestures
- When you find a new gesture, a new sound will be produced, and your phone will vibrate
- In such case, show it to your neighbors!
- Stop after the final countdown

Initial trials

The piece is intended to be premiered at ICLI2016. Some initial trials have been made at different scales: one, six and about a hundred participants. The system showed potential for engaging the audience, although some important factors are the size of the room and a quiet and focused audience.