Social interaction in an interactive sound installation

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ABSTRACT
A sound-based installation was developed as a way to explore the relation between social interaction and sound synthesis. The work, still in progress, consists of an interactive environment whose behavior changes in interaction with a group of users. Initial tests with first-time users indicate a potential the interface has to generate emergent rhythmic sound patterns.

Keywords
Tangible interface, multiple user interaction

INTRODUCTION
The growing impact of interactive technologies in daily lives presents many challenges to designers. Two particular issues of concern are how can interaction designers understand the bodily basis of human-computer interaction and embed such relations into broader contexts of social action.

These are some of the topics that commonly instigate intensive discussions in the Media Technology MSc Program, at the Leiden University. In the 2010 Sound Space & Interaction course, lectured by Edwin van der Heide, a physical interface has been developed as a way to explore the relation between tangible/social interaction and sound synthesis.

EXPERIENCE

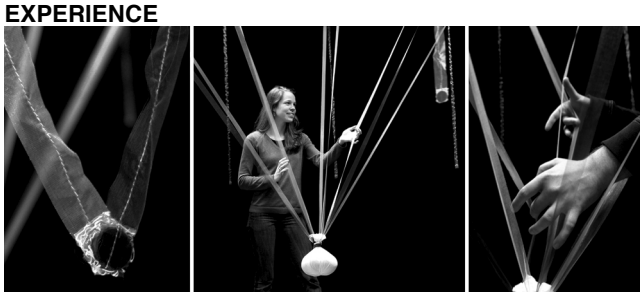

Figure 1: *Strings being bent, touched, and played by users.*

The sound installation, under continued development, consists of nine colored ribbons that hang from the ceiling in a circle. The installation remains silent until it gets touched. Once one or more users touch the ribbons, its behavior changes depending on the multiple possible forms of interaction (Figure1).

Each of the ribbons' colors corresponds to a specific sound frequency. String vibrations are directly translated into synthetized sound. This form of interaction is similar to that of conventional chord instruments, and therefore is familiar to most first-time users. As two or more ribbons get connected together, a background sound is turned on. In this mode of operation, any touch provokes a change to the modulation frequency, giving the idea that sounds are being deformed according to the way people manipulate the strings.

IMPLEMENTATION

A first prototype of the interface was built to study user's intuitive interactions of the sound installation. A weight binds the ribbons together on one end, keeping all strings under equal tension. At the top, one piezoelectric sensor is attached to each ribbon. This way, the vibrations created when users touch the strings are registered by an Arduino microcontroller. These readings are then used as input for the generation of sound.

The other end of each string hangs loose from the ceiling. Conductive threads are sewn along these ribbons in order to connect a magnet placed at the end of each ribbon to electrical power. By joining two or more strings together, users can change the sound behavior of the installation. Vibrations are interpreted as interferences on sound, rather than as the basis for its synthesis. The software component was developed in the Max/MSP environment.

DISCUSSION

Figure 2: *Single and multiple users interacting with the installation.*

The installation successfully immersed people in the experience. By testing the prototype, users not only spontaneously created rhythmic sound patterns, but also revealed unpredicted forms of interacting with it. Informal observation of several users suggests that the interface performs better when is played by groups of people simultaneously (Figure2).

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