Chrysalis

Interactive Sound Sculpture

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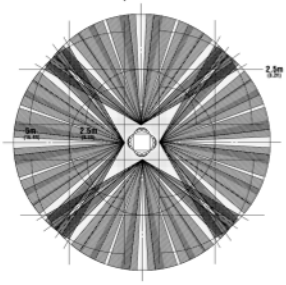
::: ABSTRACT

Chrysalis is an interactive sound sculpture that relates sustainability, the link between the human being, the environment and the processes that generates through time. The authors are Carla Colombini (sculptor), Martin Matus and Ezequiel Abregu (sound artists). The sound production system comprises three stages: *Input - Process - Feedback*. In this work are exposed the technical details of the sound device of the sculpture and the different stages implemented using, mostly, free software and open hardware.

1 ::: INPUT

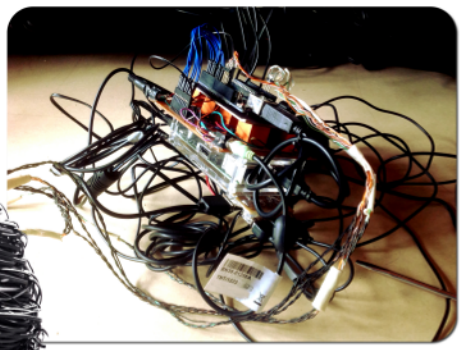
Consists of a motion detection system. Four Pyroelectric Infrared Sensors were located in the external part of the sculpture (~360° motion capture pattern). The signal emitted by the sensors is sent to an Arduino control board, then is mapped by serial port to a Raspberry Pi computer and, finally, is captured in Pure Data through the serial port as well. With this system was possible estimate, approximately, the number of people around to the sculpture area and the relative position of the spectator.



2 ::: PROCESS

A modular software of generative composition was implemented in the Pure Data environment. A Raspberry Pi V1 running Raspbian (Stretch) was used as a main OS.
The *Process* stage comprises four modules:

First module: captures the signal coming from the PIRs sensors by reading the digital inputs of the Arduino board by the serial port.
Second module: an algorithm with simple and clear rules was implemented. 3 types of sculpture "modes" were determined: *Bypass - Transitive – Interactive*
Third module: controls an array of eight relay switches distributing the audio signal in eight speakers (non- linear, non-uniform arrangement). To spatialize the audio signal we implemented a mathematical model of cellular automaton.
Fourth module: playback audio samples and process the signal applying Dynamic Envelope (ADSR), Filtering (Low Pass and Band Pass) and Global Reverb.



3 ::: FEEDBACK

Recorded sounds, obtained from the ElectroMagnetic sensor, are reproduced. Within the sculpture an octaphonic system using FRFR (Full Range Flat Response) speakers was implemented, distributed asymmetrically.

Three Interactive *Modes*:

Bypass: In absence of people around to the interaction area (~4m radius) wil be heard quiet and distant sounds,
Transitive: When sensors detect some movement, there will be a transition period (1' to 2'), between *bypass* and *interactive* mode (see below),
Interactive: According to people position the sound texture will be heard chaotic and erratic spatial sound behaviors.