Soffio (Breath)
Interactive Poetry and Words Installation

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Abstract. Soffio (Breath) is an interactive installation of words. It is composed of four mouths carved in scented soap hanging from the wall. It is an intimate installation in which the breath of the passer-by gives life to a tale which is played only just for him and it is implicitly required an exchange of emotional closeness between the poetical text and the person who creates the work through his own active participation.

1 Introduction

As an artist I use digital technology of various kinds to create content in my work: sound, photographs, video, objects in movement. As an artist I am strongly influenced by mechanics and electronics. 2002-2003 I taught a course in sound and interactivity at the Accademia di Brera in Milan and 2009-2012 I gave classes in interactive systems at the Accademia Albertina in Turin.

I became interested in interactivity in 1992, when I made my first interactive sound installation. I built a circuit with an oscillator, a speaker and a light meter. When the light illuminating the object decreased, the system produced a precalibrated note. The installation was composed of 84 of these circuits arranged in 6 rows of 14 columns and was illuminated by a light. When a visitor passing by, projected a shadow on the speakers, the system began to play. For each circuit pitch, duration and the sound volume can be adjusted. These modules have been used in various sound works concerning people, or using the movement of animals: birds in a cage or goldfish to created the sounds by projecting their own shadows.

Since 1995, I have developed a close collaboration with a brilliant expert in hardware and software who has helped me in creating of work of a more complex technology. With him, I made my first computerized installation, Memory of the surface (1995), using a second-hand Acorn Archimedes computer and a camera to photograph people and fit the images into a virtual post-atomic Hiroshima.

In the same year I began a collaboration with artist Piero Gilardi concretely realizing his interactive works: Survival, 1995 - General Intellect, 1997 - Connected Es, 1998 - Mitopoiesis, 2002 - Tiktaaalik, 2010 - Ipogea, 2010.

It was a pioneering period in which the low-cost machines available were not always up to artistic desires and imagination. Nevertheless, some interesting software and hardware were to be found. Among these, there was a system for the spatial recognition of participants. Equipping the floor with sensors or triangulating the ultrasonic signals emitted by each of the 6 viewers, their icons appeared on the screen. It was possible the detection of biological data too, such as the heartbeat or the breathing, then represented in real time by a graphic development on the screen.

1.1 What is Theremino System for Interactivity

A couple of years ago together with the engineers I collaborated with, I decided to turn 20 years of experience into a user-friendly system to interactively trigger the basic content of communication voice, images, light and gestures. I started from the block logic used by some software - or rather with a light and sound installation of cubes in which LEDs connected to each other laterally placed [1] a work I saw at ARS Electronica, International Festival in Linz some years ago - imagining that they were Lego bricks to approach and connect with each other in order to meet the intention of the project. Theremino is block-structured both in software and hardware. Each individual part interacts with the others through numerical instructions written in memory: "Slot", deposited or withdrawn at will and available to all components of the system, contemporaneously. The external interfaces and the hardware connect to each other in series with only 3 wires even for considerable distances and can receive input from sensors of many types: light, ultrasound, proximity, magnetic, accelerometers, colour and heat - others can be easily added.

There are parts of the system that handle audio as well as video or a video camera for motion capture. All these functions are simultaneously present, an audio file can manage one or different videos, or give relevance to one. An example: 4 different videos with 4 different inputs can be simultaneously animated on the screen . With the possibility of writing programming code, Theremino was born composed of blocks of specific functions that can be interconnected and activated by a large number of external sensors, readily available from distributors or from an external USB webcam.

The core of the Theremino artistic project is to focus on the meaning of the work and to achieve it regardless of the type of machine, software or other electronic device. "Look at the moon and not at the finger!".

Here follows a brief description of the Theremino system. For further details see [2].

1.2 Teaching how to use Theremino

At Academy of Brera in Milan and currently at the Albertina in Turin I structured courses on Interactive systems inspired by the artist's ancient workshop. I made my

software and hardware available, stripped any personal content and invited students to imagine new installations that can interact with visitors, focusing on new contents in place of mines. The experiment produced excellent results both by using the software to design virtual landscapes as to realize interactive installations managed by the Theremino system.

2   The Theremino

The Theremino system comprises hardware as well as software. It uses Microchip microcontrollers.

2.1   Theremino Software

The software comprises many specialised applications: HAL, Helper, SoundPlayer, VideoPlayer, Video Input.

The Hardware Abstraction Layer (HAL) simplifies the USB communication and the complexity of the hardware by transforming all signals, requests or commands into numbers "Float" in the input and output boxes from 0 to 999 called "Slot".

The Helper manages the opening of all executable content in the work folder, their closure and the possible switching off of the computer.

The SoundPlayer can employ several files simultaneously, and is used to play audio files. It has filters that can be activated at will to modify the sound. It also controls the execution of the video files, both forward and in reverse. It can play files in both directions. It manages the frequency of the sound, changes the track automatically in sequence or randomly. Activating the stereo function it is possible to direct the sound to pre-assigned speakers. All of the operations provided by interactivity are verified manually with the sliders.

The VideoPlayer is used for displaying a video or several independent videos at the same time in windows or in full screen of. The video display operation is controlled by the SoundPlayer.

Finally, the Video Input allows motion capture with USB video camera - dozens of sensitive areas of different size and position can be programmed. It may be associated with audio, video, coloured LEDs, mechanical movements.

2.2   Theremino Hardware

The hardware comprises three main components: Master, CapSensor and Servo.

The Master The *Master* is a card that connects with the computer via USB port and receives signals from Slaves via a bidirectional serial bus comprising earth, 5V supply and a data line that can be tens of metres long. It features 6 Pin In / Out similar to the Slave Servo (section 2.2.3).

The CapSensor The *CapSensor* is an additional module that measures specifically the proximity of a body, a hand or an object. As sensor it employs a metallic plate by which it measures the capacitance modified by an object approaching its field of measurement. By varying the dimensions of the plate, the sensitivity of the measurement is changed, enabling measuring ranges from 50 cm to several metres. This card has been developed principally to allow the interaction of a hand as it approaches or moves away from the sensor so controlling audio, video, light or an electric motor. In contrast to ultrasonic sensors, it works through wooden or stone walls while it is almost totally inhibited by a metallic wall.

The Servo The *Servo* is the most complex and versatile module. It has ten connectors, also usable as generic input / outputs.
The connectors are suitable for standard servo controllers (GND / +5V / Impulse signal from 920uS to 2120uS and 15..20mS).
Every single pin can be configured independently as Servo, ADC input for potentiometer and other similar transducers, input for capacitive keyboard, digital input, digital output, like PWM output, etc.

2.3 Sensors

Different sensors can be used with the Theremino system. For example, Proximity sensors are realised by a metallic plate with dimensions according to the action range required. A square plate measuring 5 x 5 cm in fibre glass PCB is sufficient to detect a hand up to a distance of 50 cm. Commercially available ultrasonic sensors detect objects up to a 4 metres distance.

Control of sliding or linear potentiometers - may be associated with audio, video, coloured LEDs, mechanical movements.

Motion capture with USB video camera - dozens of sensitive areas of different size and position can be programmed. They may be associated with audio, video, coloured LEDs, mechanical movements.

3 An Interactive Installation for ESSEM 2013: Soffio (Breath)

Soffio, 2011 (Breath) is an interactive installation of words[1]. It is composed of four mouths carved in scented soap hanging from the wall (see Fig. 1). The Theremino-based architecture is sketched in Fig. 2. Under every mouth, it is placed a loudspeaker facing the visitor. The visitor's breath over the soap mouths starts up the emission of phrases from a poem or from many more poems shared out into the single carved mouths. Each mouth/loudspeaker plays its awarded part of phrases of a poem while the other mouths keep silent, either if they are activated by the breath of more visitors-actors, they can recite at the same time the other phrases. When one of the

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[1] See video on: `http://www.enniobertrand.com/interactive`.

phrases of the poem ends, the system automatically switches to the next and to hear it again one has to breath once more towards any among the mouths.

Fig. 1 The installation.

It is an intimate installation in which the breath of the passer-by gives life to a tale which is played only just for him and it is implicitly required an exchange of emotional closeness between the poetical text and the person who creates the work through his own active participation.

Breath forms part of a development of my interactive works during the last two years devoted to word and poetry. Other analogous works are "Words" with passages from "Napoli milionaria", and a latest version of "Words" with texts from One hundred thousand milliards of poems by Raymond Quéneau in which the requested proximity is that of the hand approaching to symbolic objects placed upon a table.

They are "unfinished" works which require outward participation to be accomplished. Moreover, they are "unsettled" because the narrative development is virtually unbounded and casual.
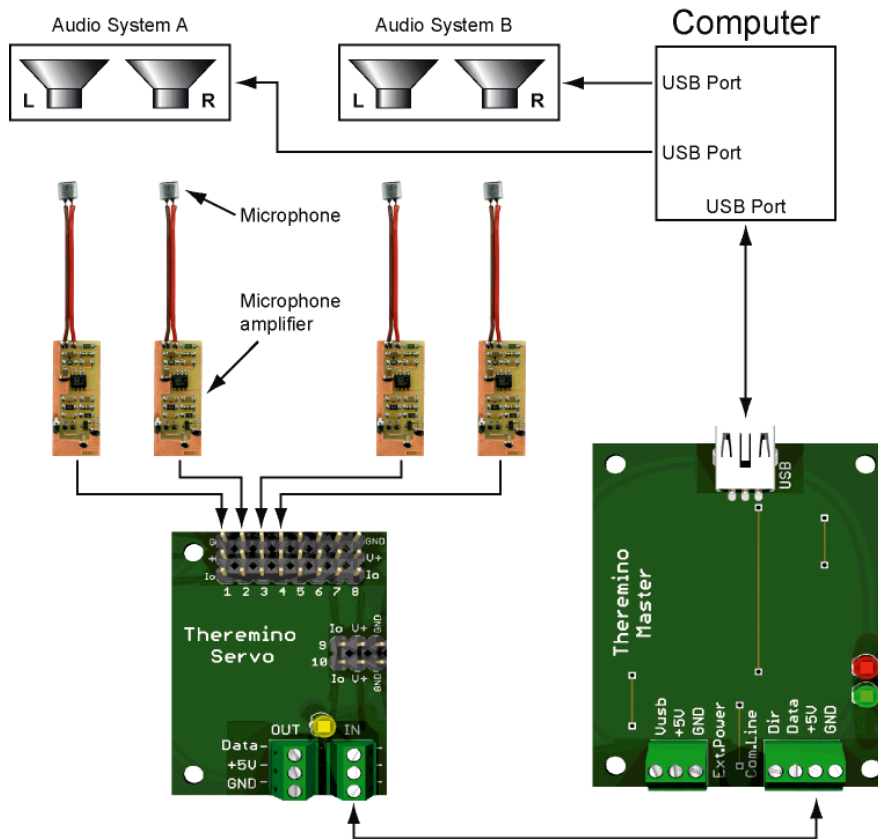
Fig. 2 Soffio's (Breath) architecture

4   Conclusion and Future Work

This paper described the interactive installation Soffio (Breath), and Theremino, a hardware and software platform proposed for simplifying the creation of interactive systems by creative, non-technical people. The paper presented the rationale of the work, its main features and put the system in the context of related work. Future work regards enhancing both the hardware and the software, for example supporting wireless connections and integrating the software modules to existing and widespread software tools for art & creativity (like Max and Pure Data).

References

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