

CELEBRA

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ABSTRACT

In this paper, we present Celebra, an interactive installation and performance tool comprising two hundred LED lit balloons. We discuss its motivation, its first implementation and its technical details.

1. INTRODUCTION

In this paper, we present Celebra, a massive, site-specific, interactive, post-geographic installation and performance tool. Celebra comprises a suspended network of two hundred, one square meter led lit balloons, showing an organic aesthetic that combines the grunginess and DIY style of the underlying electronics with a refined visual output and interaction scheme.

Our work, in Celebra, is framed within three main axes:

1) Media appropriation[1]: the utilization of technology as a raw medium of artistic production, where artists dip arbitrarily down into the technological components, adapting and creating new ones, producing new new media artworks.

2) The explicitness of interaction: although all art is interactive (in Duchamp's too often cited words [2]: *"The creative act is not performed by the artist alone; the spectator brings the work in contact with the external world by deciphering and interpreting its inner qualifications and thus adds his contribution to the creative act."*) by making the interaction explicit we can work on the interaction aesthetics and we can attempt to create an artistic interaction language.

As Myron Krueger said [3], *"I have been trying to raise interactivity to the level of an art form as opposed to making art work that happened to be interactive."* In Celebra, we actively tackle the aesthetics of the interaction while offering the audience a refined, awe inducing, immersive experience.

3) The geographical and socio political contexts: In Eladio Dieste's words [4], *"Each problem [...] should be faced with a sort of ingenuity, [...] with an attitude humble and vigilant. It should be thought again, with the basic body of knowledge that is now the heritage of all men"*, but assuming it implies a radical change of attitude, embracing its context, its space, and its time.

2. CELEBRA

[[insert pictures here]]

Celebra comprises a network of two hundred balloons lit by LEDs and controlled by a central system.

The piece is both implicitly and explicitly interactive. Implicitly interactive in the sense that the audience can walk into the balloons network, touch and move them. Celebra, when installed outdoors, is also moved by the wind.

Its explicit interactivity is multimodal. As an interactive, stand-alone, installation, the piece reacts locally to in situ and remote interactors, and globally to the ambient sound or music. The balloons change their colour as a response to interactors movements (tracked using Kinect cameras) or the sound they might make. It also, globally, reacts to sound, and can be automated with the same set of tools that the performance mode has.

When used as an instrument, performers (it supports up an arbitrary number of concurrent performers) have at their disposition a rich set of tools and parameters to modify. Celebra admits input from video sources (live video or filmed) that can be mapped onto the balloons. The performers can select the videos, change their mixing parameters, trigger specific animations, colours, reactions, etc.

Celebra mixes two often seen as contradictory aesthetic paradigms. It offers very refined control interfaces and interaction schemes, while, at the same time, embracing the rough and grunge aspect of some DIY projects.

The power supplies, connectors, boards, and cables, are all visible to the public. Interactors can trace all the connections and follow the control paths. The boards are covered with transparent protections (made out of recycled plastic bottles), and all the parts are visible.

This explicitness of the underlying technology shows its appropriation by both the artists and the public. At the same time, its grunginess and lo-fi aspect, collides with the refined interaction and ethereal qualities of the light, creating a tension that is for the public to resolve and which becomes central to the artistic proposal.

3. SITE SPECIFICITY

Celebra was originally created under a commission by the Uruguayan Government as part of the celebrations for Uruguay's bicentenary. We chose to use two hundred balloons as a direct tribute to the country's age.

The piece is conceived as a communication and connection tool. It brings together the interactors, both local and remote. The artistic fact is highlighted and enhanced when the work is experienced by several persons at the same time. They implicitly collaborate on it, and the piece shows this collaboration in real-time.

In its first installation, within this celebration, Celebra was shown at *Espacio de Arte Contemporáneo*, a public museum in Montevideo, Uruguay, created in a recycled prison. The piece was installed at the prison's patio.

By installing this playful artwork, the space is again reclaimed, and a reflection onto the country's recent history is proposed. By allowing interaction with the remote

audience, the prison (and the museum) walls are perforated, the artwork is expanded and transcends its physical immediacy.

4. TECHNICAL DETAILS

Celebra implements a client-server architecture, with the server receiving frames (i.e. a complete specification of all the balloons' colours) from the clients, and mixing them into the final balloon colour configuration.

Celebra uses Macetech's Octobar boards as LED drivers, each controlling, by means of eight A6281 chips, eight RGB LED modules. Octobars can be daisy chained (both power and data) and thus they can control a very high number of balloons.

Connected to the server is an mBed board, a multi-purpose programmable 32-bit micro-controller with a built-in Ethernet interface and an implementation of the UDP stack protocol.

This device runs custom code that makes it behave as a standard DMX controller, fully implementing Artnet's DMX protocol [5].

In Celebra, the mBed acts as an interface between the low level light system and the interaction software, receiving Artnet DMX UDP packets from the interaction software and translating them into TTL signalling, understandable by the A6281 chips of the Octobar.

Celebra uses 3W RGB LED modules and standard PC power supplies that power the Octobars and mbed.

SOFTWARE

The client-server architecture allows Celebra to instantiate different clients, each handling a different type of interaction (movement, sound, web, etc.) that send frames for the server to mix in real time.

The communication between the clients and the server uses an adhoc application network protocol over two communication channels: a TCP channel for control data, and a UDP channel for transmitting frames to the server.

During the handshake, the server informs the new client on all the aspects of the current installation (i.e.: balloons quantity, balloon location and identification number), and starts listening on an exclusive, per-client UDP socket for each client to send frame data.

The protocol allows for binary and XML based communication, and the communication speed is renegotiated in real time by the server and its clients.

The server holds a 3D representation of the balloon cloud, and offers it to every new client.

The parameters of the frames mixing can be changed in real time by the performer, be pre-set to follow a sequence, or react to the interactors' input.

The server was developed using openFrameworks , an open source framework for creative computing.

Currently, Celebra implements four different clients, some of them (sound, Kinect) where created using Java and Processing, the video client was created using C++

(openFrameworks), and the web client is a Python application. They behave as follows:

- The sound client changes the colour of the balloons located near one microphone.
- The video client offers a VJ tool of sorts, mapping videos (stored in several banks that are offered to the performer) onto the balloons. Each balloon then represents a pixel or group of pixels in the original videos. The client offers the performer with some traditional tools of VJing, such as scratching, mixing, pausing, speed control, etc. It also allows for control using a MIDI device.
- The Kinect client uses the 3D information of the cloud to identify and track the interactors, making the surrounding balloons react to their position and movements.
- Finally, the web client holds a web server with a Java Applet that displays the server's Multicast channel and sends user action messages to the Python server via WebSockets.

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6. REFERENCES

- [1] Laurenzo, T. 2009. New Media Art. Facultad de Ingeniería. Montevideo, Uruguay.
- [2] Duchamp, M. 1957. The creative act. Session on the Creative Act, Convention of the American Federation of Arts.
- [3] Mitchell, B. 1999. Krueger M. W.
<http://www.siggraph.org/artdesign/gallery/S98/pione/pione3/krueger.html>, web site. Last visited March 2013.
- [4] Dieste, E. 1998. Introducción a la teoría. Facultad de Arquitectura. Montevideo, Uruguay.
- [5] ArtNet. 2012. Art-Net 3 Ethernet communication standard.