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ABSTRACT

SoLu: hyperinstrument

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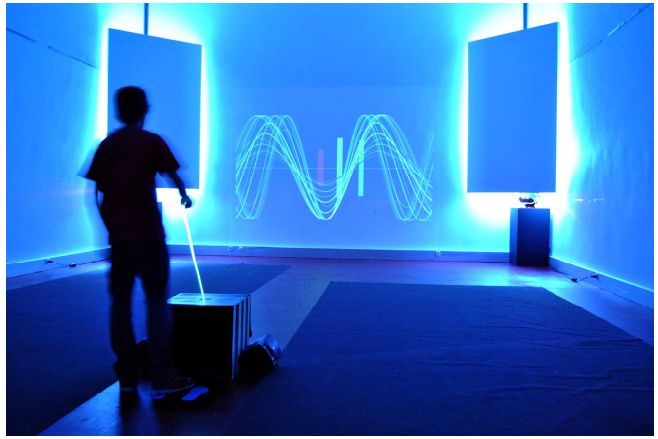
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SoLu - Hyperinstrument

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Abstract
Demonstration of a proposal of correspondence between Light and Sound. This proposal is materially exemplified by means of a new hyperinstrument, which gives its users the control over a multi-sensorial algorithmic composition generated in real-time. The employed methodology and mathematical model were presented with some detail in a previous, insofar as they pretend to be matter and reference for future developments in the field of multi-sensorial composition. Audiovisual documentation of the demonstration and previous paper available at: http://3kta.net/solu

Keywords
Sound, light, interaction, synesthesia, hyperinstrument, meta-conception, generative design, algorithmic composition.

ACM Classification Keywords
H.5 Information Interfaces and Presentation; J.5 Arts and Humanities.

General Terms
Design, Experimentation, Performance, Theory

Introduction
There is in contemporary art a growing interest in interactive and multi-modular works (Campos, Traldi, Oliveira & Manzoli, 2007). The power of modern computers and its processing ability offer new

possibilities to musical, visual, multi-sensorial interactive composition. The Art of today is real- time Art, live Art where what counts is its instantaneity (Virilio, 2005): the hyperinstrument created to this demonstration is therefore part of that present Art trend, for it calculates audio-visual composition in real-time. As a hyperinstrument, the main goal of its meta-conception was its easy and intuitive utilization by human beings.

The hyperinstrument prototype that we present allow people with few or very few skills, while users and creators of audiovisual, to participate in a process of generative algorithmic composition.

Sound and Light

Sound and light occurrences are phenomena of energy transport studied simultaneously by physics. They both propagate through waves and they both need a time interval between their emission and their reception. In spite of big differences in greatness and speed, both sound waves and electromagnetic waves are represented by the wavelength and frequency. Along the times there have been several models and devices that aimed the real-time performance of visual and sound events. Of all the possible correspondences between sound and light, the mapping of musical notes or heights to color tonalities was the most common proposal in the last 300 years. Considering that the piano is the most commonly used instrument in the process of composition, and is besides that, from all the elements of the classical orchestra, the one that produces the largest spectrum of musical heights, we have decided to take it as a reference in our demonstration. The correspondence between light and sound that we propose was obtained by applying the mathematical model [1] that was better adjusted to convert the exponential spacing of the intervals between the fundamental frequencies of the notes comprised in a piano's texture into linear spacing from the wavelengths of the visible electromagnetic spectrum.

Conclusion

The implemented algorithm, which allows the correspondence between sound frequency and color light frequency, will certainly integrate future multi-sensorial compositions, seen that we consider its reutilization and betterment. We conclude that the correspondence between color light frequency and sound frequency associated to the conception of interactive multi-sensorial systems is fertile ground to future researches.

Notes

[1] Mathematical model developed to convert fundamental frequencies values of the piano notes to the color wavelengths of the visible spectrum: n = 700 - (12*(log(f/220)/log(2))+36)*3.44827586207

References

[1]CAMPOS, Cleber; TRALDI, Cesar; de OLIVEIRA, Luis Felipe; MANZOLLI , Jônatas; (2008), *Anticipation, Improvisation and Multimodality: Musical Meaning on Interactive Performance.* Music Department, Arts Institute, University of Campinas [Online]: http://recherche.ircam.fr/ equipes/analyse-synthese/EMUS/AGORA/ abstract_poster/manzolli_poster_EMUS_ AGORA_abstract.pdf

[2] VIRILIO, Paul; Lotringer, Sylvère (2005), *The Accident of Art*. Semiotext(e) Ed.

[3] www.3kta.net/solu