CUANDO CANTO BAJAN LOS CERROS:
AN INITIATIVE FOR INTERFACE DEVELOPMENT
INFORMED BY A LATIN-AMERICAN CONTEXT

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ABSTRACT

This text describes the design of an interface informed by the context of experimental electronic sound artists that affords the use of movement to control variations on the signal produced by a performer. Its main purpose is to activate new formats of interaction between Latin-American vernacular vocal performers and technology oriented performers by increasing their range of choices for gesture related control. This interface attempts to generate a gestural language appropriate or relevant to the socio-cultural environment for which is created. The interface processes the audio signal received from a vocalist/performer by sensing and mapping in the digital domain the movement of the performer’s hands in four independent electric sensing fields, each corresponding to one kind of processing: sample loop recording and playback, reverberation, loop delay or repetition, and basic frequency filtering techniques.

1. AN INITIATIVE FOR INTERFACE DEVELOPMENT INFORMED BY LATIN-AMERICAN POPULAR ELECTRONIC MUSIC PERFORMANCE ENVIRONMENTS.

This paper applies both observations of specific Latin-American popular musical environments and an analysis of relevant socio-political issues to the technical decisions and material choices of interface design.

Sound production and manipulation, as well as the conceptual models they rely on, depend on socio-cultural circumstances, personal biases and details related to the particular environment in which they flourish. However, conceptual models and interface design consider, mostly, universal notions of human-instrument/machine interaction; instead of a ‘glocal’ participatory model that could bridge the gap between context and machine, empowering a community to contribute and improve the process of interface development. Validation of the models produced by the initial exploration on this paper will be defined in due time by internal conversations within the community and both the freedom and limitations the interface design will generate.

It becomes important to mention here, that existing research on electronic music in Latin America applies historical and anthropological tools, as well as traditional ethnomusicology to the generation of archival materials to describe the activities of the Latin-American ‘scene’ – in existing literature, the academic electro-acoustic scene. This research is problematic for the current discussion, as it exclusively relates to those performers or composers who reside in the academy, thus excluding vast folk worlds of popular experimentation with electronics and technology used for sound processing and their corresponding subcultures. Ironically, existing research tells us, for the most part, about the Latin-American musicians and composers educated outside of Latin America who have had the opportunity to become part of other contexts both geographically and intellectually, which are in turn imported back into Latin America. In order to propose a “Latin-American” environment for the sound arts, the specifics of the particular cultures and the uniqueness of the living conditions and political situations in Latin America have to be taken into consideration. These considerations can in turn feed back into creative processes and technical applications.

2. A CASE STUDY: DESIGN VALUES SUGGESTED BY PERUVIAN CONTEXT.

The interface design presented here applies a series of design ‘values’ that correspond with a ‘Peruvian reality’ or at least to the context of Lima, the capital, as a conglomerate of fragmented subcultures representing all

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1 The saying ‘when I sing the hills come down’ is attributed to the singer Lorenzo Palacios Quispe (Chacalon). Chacalon was baptized The Pharaoh of La Chicha by oscar D’Leon and he represents the rise of Peruvian Cumbia Both Chicha and its cousin the Peruvian Tecnocumbia represent the implementation of electronic instrumentation to traditional Cumbia. Originally rejected by the ‘higher’ classes, its current acceptance is a sign of the development of a hybrid cultural of acceptance and negotiation, for the new ‘Peruvians’

2 Thanks to the Digi-arts UNESCO Knowledge Portal, La Fondation Daniel Langlois and the work of Ricardo Dal Farra this information is available on the internet.
areas of Peruvian life. They are generated thinking on both what is present and what is needed. The vision of the Peruvian reality presented here requires further exploration and relays on information outside the scope of this paper.

In order to gain relevant information, a conference was held at the Sonoteca of the Centro Fundación Telefónica in Lima on April 24th, 2008, under the title: Estrategias y Características de la Música Experimental Electrónica Limeña. On this conference, three sound artists representative of Lima’s electronic experimental scene discussed what they considered could be strategies or characteristics present in the mind of the experimental electronic sound artist of Lima and how they affect their practical and aesthetic decisions. I have also taken under consideration my own experiences in Perú and personal communications with different sound artists from Lima. The following discusses my attempt to integrate these notions into an initial set of ‘values’ that could correspond to our ‘Peruvian’ identity as musicians.

2.1 Democratization of access

Latin America is in a state of constant economic crisis, and the difficulties and vulnerability of the Peruvian markets cannot be taken lightly when deciding to develop tools that you expect to be accessible. In countries where the only solution for accessing software that has become vital for human interaction is piracy, the only practical recommendation is active participation on an open and independent freeware culture. For this reason the software platform used by the interface is Pure Data, a graphical programming language for the creation of interactive computer music and multimedia works, created by Miller Puckette at the University of California in San Diego. Pure Data has opened the door to digital artists in Latin America to a world of musical creation that relies on the aesthetics and political implications of the free Open Source software culture.

The search for a ‘legitimate’ working software platform is not merely a utilitarian quest, since “(s)oftware is not just a device with which the user interacts; it is also the generator of a space in which the user lives” [5] it becomes obvious that the case of Perú calls for the support of free or affordable options.

2.2 Demystification of technology.

When a Latin-American artist thinks about foreign environments, there is the idea that technology is expensive and inaccessible, that is designed for the ‘other’. Before a “rupture of the borders” in the access to technology occurs, the contemporary Latin-American musician has to deal with very well marked borders and the implications they have on musical generation and experimentation. On a buyer-driven commodity chain where technological advancements result in products for commercial consumption, many Latin-American artists find themselves rapidly out of the race. In many cases the aesthetics of music in Perú depends on obsolete commercial products that end up defining musical styles and political positions about musical performance.

2.3 Austerity Measures

Peruvian artists have access to an environment that nourishes artistic experimentation. Tools and hardware, however, are not as easy to come by. For many electronic musicians of the popular electronic scene the artist does not choose the instrument, but the instrument chooses the artist (love the one you’re with). The parts used on the interface had to be determined by price and accessibility. None of the elements used for sensing and mapping the information require expensive parts or complicated implementation. This is also related to the possibility of ‘losing’ your interface between performances. You don’t want your equipment to be an object of desire to a potential mugger.

2.4 Local strategies for Consumption

As a result of long periods of political and economical turmoil, generations of Peruvian artists, find themselves unimpressed by the notion of consumption and expense. The shopping paradigms of some western countries are considered by many as wasteful and unnecessary. Peruvian colloquial language argues, through the use of specific terms, for an informal understanding of the processes involved in accessing goods. The Peruvian electronic artist is, for instance, ‘recursero’ as he/she takes advantage of the goods at hand while finding a particular pleasure in reactivating old and unused instruments or finding musical use to apparently expensive and inaccessible, that is designed for the ‘other’. Before a “rupture of the borders” in the access to technology occurs, the contemporary Latin-American musician has to deal with very well marked borders and the implications they have on musical generation and experimentation. On a buyer-driven commodity chain where technological advancements result in products for commercial consumption, many Latin-American artists find themselves rapidly out of the race. In many cases the aesthetics of music in Perú depends on obsolete commercial products that end up defining musical styles and political positions about musical performance.

MINIMUM RESOURCES

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were I grew up (Lima, Perú), and particularly on the problems I had during my youth accessing technology for musical purposes. Under the motto of ‘low budget, high concept’ and the intention of generating the best practical results with the elements at hand, this interface attempts to use tools publicly available at a low cost.

I believe the possibilities of implementing an interface in a cultural environment are directly dependant on our knowledge and considerations of the areas we would like to implement them. In this way, even though this tool has possible universal application, it is designed thinking on low budget Latin America and with the conceptual push of the DIY culture of the United States.

This is why the tools selected for the creation of this interface require a low technical and economical investment. Creativity, simplicity and personal time are the basic necessary elements for its implementation.

The interface uses three basic tools: (1) Pure Data, (2) T-sensors or Theremin circuits and (3) piezoelectric transducers; as described in the following section.

### 4. BASIC OVERVIEW OF THE INTERFACE AND TECHNICAL DETAILS

The interface consists of a wood and metal foldable circular structure that when opened surrounds the singer at waist level (see Figure 1).

![Figure 1. Basic wood interface structure with hidden cables.](image)

Two versions of the interface have already been tested. One made out of wood and a second one made out of cardboard. Further testing will define the best option by comparing portability, weight, durability and resistance. The interface is divided in four areas (see Figure 2). Each one of these areas includes different sensors for the capturing of information.

![Figure 2. Four areas of the interface and performer’s position.](image)

Only a basic knowledge of Pure Data is necessary to make the patches run. Alternative variations could and will include more sophisticated patches according to specific requirements by different authors or performers.

Area 1: controls a Pure Data Reverb patch.
Area 2: controls a frequency filtering patch.
Area 3: controls the playback of a sample of voice.
Area 4: controls a delay loop.

To take advantage of the regular stereo audio input on a computer, one side of the stereo signal is assigned for the performer’s microphone and the other to a piezoelectric transducer (from now piezo) used to turn on and off the singer’s input.

The piezo is used as a contact microphone and set through the audio input for Pure Data and to a db/gain threshold. By tapping on the piezo a mute option for the microphone is activated. I do not consider this to be the more effective way to generate an on/off sensor but is definitely the most accessible in comparison with commercial touch or pressure sensors.

Movement information is received by Pure Data through classical standard Theremin or T-sensor circuits. This selection is also important for the simplicity of its fabrication and the accessibility of the materials.

Trying to recover the use of basic Theremin circuits, the interface uses the performer’s hands as the ground connection for a variable capacitor. The distance between the hand and the ‘antenna’ determines the capacitor’s value. The value received is converted into MIDI through a voltage to MIDI converter and the data received by a computer for processing in Pure Data.

![Figure 3. T-sensor circuit, microprocessor and switcher.](image)

4 T-Sensors, one for each of the areas, are connected to a PIC and routed to 4 MIDI channels. The numbers received are scaled to a pre-determined range for more detailed control. The Sensors are a variation of the one used by Terry Fritz on his Theremin Vision – II, an essential source of information [6].
An example of contemporary use of electric field sensors is the Multimodal Music Stand developed at the University of California, Santa Barbara [7].

All the T-sensors are connected to a microprocessor through an analog switcher. The analog switcher, under control of the microprocessor, is used to periodically route one of the sensors to a counter input pin on the microprocessor, since the processor is only able to read one sensor at a time. The value of the counter at the end of the measurement period reflects the capacitance between the antenna and the target.

The processor sends a signal to the computer through a commercial MIDI interface. Pure Data reads directly from the MIDI port the information from the sensors as incoming pitch bend values with the [bendin] object according to the MIDI channel assigned.

Once the signal is received, an initial calibration needs to be made to define the minimum and maximum distance points for the sensors and their equivalent numbers. Some basic math is necessary to convert the pitch value received into a range that starts with a zero to maintain the effect lines deactivated until the hand crosses the range of control. The sensor antennas, visible on the cardboard versions (see Figure 4) are made out of a piece of flexible galvanized wire of 5 x 5 inches each. The current setup provides a range of about 6 inches. This is measured perpendicular to the surface of the antenna. The sides are less receptive which is helpful to avoid interference from the body of the performer. The sensing range has been calibrated according to the distance between sensors and the physical comfort of a performer-singer. This range can be lowered, if necessary, by adjusting a 100k trimmer on the sensor.

Figure 4. Cardboard version with 3 T-sensors tested in Perú.

5. CONCLUSIONS

This interface is developed with the hope of generating alternative gestural and performative techniques useful to a specific cultural environment: Lima, Perú. It also uses for its construction a postcolonial approach in the sense that it hopes its relevance can be primarily defined by the users in their context. It is a work in progress that calls for a language that represents the unique needs of a culture-region and the realistic possibilities of technological application for that particular setting. The possibilities of human computer interaction depend on our definition and careful consideration of the ‘human’ participating in the process. The technological choices are not attached in any particular way to Peruvian culture but are used as an attempt to look at the process of adopting foreign technology for local use. This paper is intended to lead to further research into the possibilities raised when exchanging technological ideas for music making across cultural divides.

6. ACKNOWLEDGMENTS

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7. REFERENCES