

## CyberSong

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### ABSTRACT

We present our work in the development of an interface for an actor/singer and its use in performing. Our work combines aspects of theatrical music with technology. Our interface has allowed the development of a new vocabulary for musical and theatrical expression and the possibility for merging classical and experimental music. It gave rise to a strong, strange, unpredictable, yet coherent, “character” and opens up the possibility for a full performance that will explore aspects of voice, theatrical music and, in the future, image projection.

### Keywords

Theatrical music, computer interaction, voice, gestural control.

### 1. INTRODUCTION

CyberSong is a collaborative piece of theatrical music created by Paulo Maria Rodrigues, Luís Girão and Rolf Gehlhaar. It is a structured improvisation that develops from a personal journey of discovery on the potential of the interaction between a performer and a computer. At the root of the performance lies the traditional “classical” singer’s clothing, the tails, which has been transformed to host a set of electronic controllers that communicate with a computer. CyberSong explores the challenges of meeting “classical” music (the sound utterance, the theatrical context) with new technologies (which causes the redefinition of the role of the performer/interpreter/composer). CyberSong involves a singer/actor that processes his own musical discourse in real-time. There is a set of “sound objects” and “theatrical actions” (including the musical/theatrical treatment of scientific/artistic relevant texts) that serve as departing points for a dialogue between the performer with his memories (instant or long-term) and the gesture that results from the electronic manipulation of the sounds. In this paper we examine: 1) how the idea of developing a new instrument for musical expression allowed us to establish a dialogue between artists with very different backgrounds, 2) how the technical and performing possibilities of a simple idea gave rise to a coherent performance in musical and theatrical terms, 3)

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how this has changed or enlarged the usual range of tools for musical and theatrical expression by a performer from a classical/operatic background 4) how other people have perceived the performance.

### 2. BACKGROUND

The CyberSong project has its roots in the individual research and performance experience of its creators. Since 1970 Rolf Gehlhaar has been experimenting with both mechanical and electronic technology towards the development of new sound sources for the making of music. Most of them were quite simple; a few of them have matured and became musical instruments. One of these was ‘superstring’, [1]. Gehlhaar performed with it many times, solo, accompanied by electronic sounds on tape or with others in an ensemble (Feedback Studio Ensemble, 1970-76). Most importantly, however, was that its sound was clearly very attractive to the ‘average’ listener, particularly to the musically untrained. The first thing people would say after a performance was always, “Can I have a go?” This fact inspired Gehlhaar to devise a musical installation with it – a public improvisation room - in the Folkwang Museum in Essen, Germany in 1972. [2]

The second set of ‘instruments’ Gehlhaar devised was for his personal use, within his compositions or to play in the Feedback Ensemble: They were called “Nail Gongs”, [3], [4].

In another different area, that of electronics and interactive music, Gehlhaar’s work led to the creation of SOUND=SPACE, an interactive musical environment that was used in installations, in creative play and therapeutic workshops, in dance or as virtual instrument for musicians. The general idea is that an Ultrasonic Ranging System using echo-location, surveys an empty space and measures very precisely the positions and movements of any persons or objects. These measurements are then employed by a computer to generate MIDI commands that control sound synthesizers. A full description of SOUND=SPACE is available at [5] and it has been a reference for many other researchers work in the field of interactive music. Recently, the work of SOUND=SPACE evolved into HEAD=SPACE, a MAX/MASP instrument for a disabled musician. [6]

Another root of CyberSong comes from the work of Paulo Rodrigues and Luís Girão. In the first case, after many experiences as a classical/operatic singer, his work started to be developed more into the direction of creating new pieces of theatrical music [7]. In recent times, the collaboration of Girão and Rodrigues led to the inclusion of interactive multimedia in

theatrical music projects, such as Bach2Cage, where very simple interactive tools were developed in order to integrate both sound and image manipulation in real-time performance [8].

The emergence of a regular academic and artistic collaboration between the three led to the idea of developing an interactive garment that a performer could use in his performance. The idea was inspired by recent developments in wearable computing. The purpose was not, however, the development of a highly sophisticated instrument, but to create a simple and versatile tool that could allow the emergence of theatrical/musical “character”, in other words, a “performing being” that would connect the cyber world with the classical music world.

### 3. TECHNICAL ASPECTS

#### 3.1 Interface: the CyberTails

A microphone is used to capture the singer/actor’s voice and to pass it to a computer where it is stored and processed. The performer has access to the commands of the computer program via sets of electronic circuits implanted in a coat (classical music “tails”). Buttons and sliders allow the performer to trigger or change continuously electrical current (5V). This information is processed by a programmable microprocessor (STAMP 2) and sent as MIDI information to a MAX/MSP patch in a computer (Fig 1)

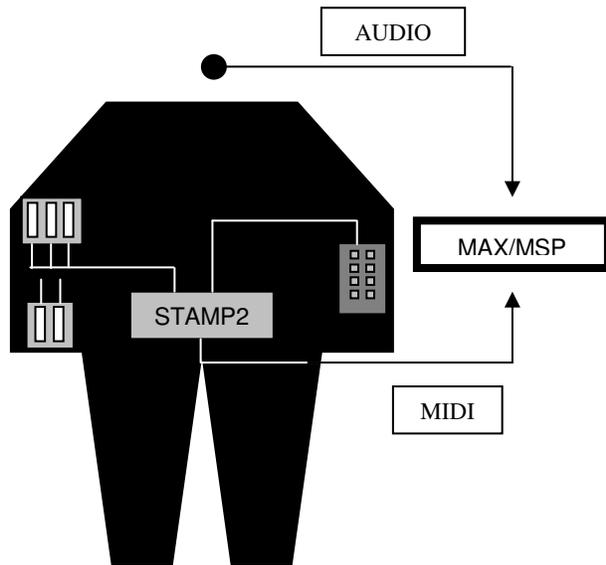


Fig 1. General scheme of the elements of the CyberTails

A circuit with eight buttons allows the control of functions related with recording and playing audio in real-time. These functions are: start audio (switches on the audio output of the entire program), stop audio (the opposite), record on (activates the recording of the sound into a buffer of fixed size), record off (deactivates the record on), play (plays the contents of the buffer), clear (erases the content of the buffer), loop on (loops the contents of the buffer), loop off (stops the looping). A circuit with two faders controls the length and direction of the loop playing. A circuit with three faders controls two effects, feedback and delay and the dry/wet mix (Fig.2).

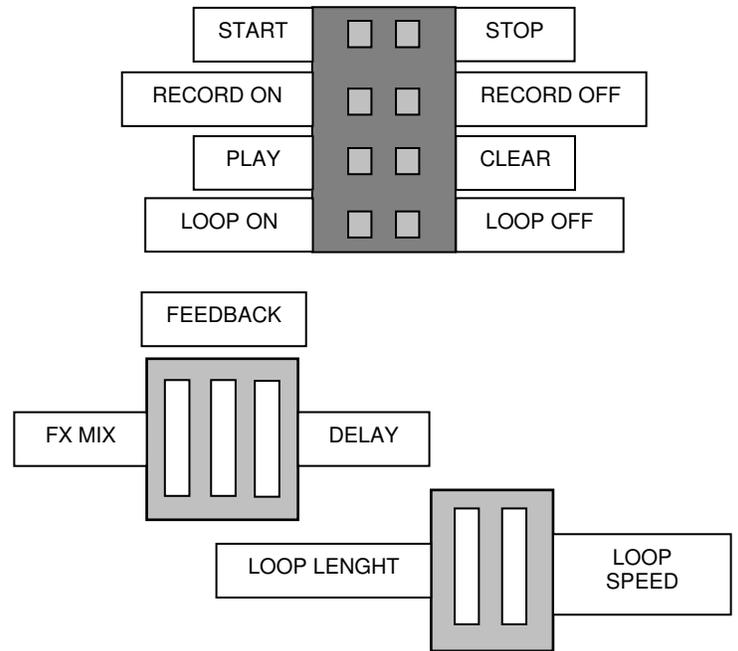


Fig.2 Detail of set of controls.

#### 3.2 Max/MSP Programming

The architecture of the Max/MSP program developed for the CyberTails is divided in two types of data. The first one is MIDI data, incoming from the PARALAX micro-processor STAMP2, that has been programmed to receive and convert analog current variation into digital serial communication. The second one is audio data. The program relates this two kinds of information and outputs processed sound as a result.

The MIDI data is composed by start/stop messages coming from the buttons, and value variation messages (0-127) coming from the sliders. Three of them are used to control parameters of the sampling process: start/stop recording and erase. This process is based on a 2000 milliseconds buffer. The playing process has 7 parameters, also controlled by the incoming MIDI data: play, stop, loop on and loop off as start/stop control, and loop length, loop start and loop direction/rate as value variation control. There is also the possibility to record and recall an audio file with the buffer content, but this operation is not controlled by the singer.

After this recording and playing process comes a process chain composed by two effects: LFO and reverberation. The LFO effect has feedback, delay and dry/wet balance parameters controlled by incoming MIDI messages, and modulation rate and depth, and panning rate parameters controlled directly in the patch. The reverberation module as reverberation time and dry/wet balance controlled by incoming MIDI messages and early reflections time and high frequency rolloff, controlled directly in the patch.

A memory section composed by presets allows to record and recall values to all parameters. This section is associated to a MIDI on/off button that allows to recall these memories. The MIDI control has to be turned off in order to recall the memories, otherwise the program assumes the incoming MIDI values.

All the parameters controlled by the singer can also be controlled by the second performer, due to the fact that all incoming MIDI messages are gated, i.e., the second performer can select to activate or deactivate each parameter control of the singer.

#### 4. PERFORMANCE

Since late 2003 CyberSong has been presented in several circumstances: it has been part of a recital for voice and piano which followed the traditional/classical model, it has been presented in contemporary music concerts (in the line of classical tradition) and in experimental music performances (Fig. 3).



Fig.3 Aspects of a performance of CyberSong

In Discussion we will analyze these different situations and the peculiarities of CyberSong in these contexts. Although CyberSong has a strong improvisational component, we have used also some recurrent elements, both musical and theatrical. Some of them have been notated and that is what we mean by “score”, a quite loose indication of sound and theatrical actions that we experimented and found particularly effective.

#### 4.1 The musical and theatrical content of CyberSong

The “score” of CyberSong includes a set of possible “sound objects” that can be arranged by any order decided by the performer. It also includes a set of theatrical/sound actions. The idea of CyberSong is to provide an environment or a musical/theatrical “instrument”. It is up to the performers to develop further their own “vocabulary” and to establish a “syntax”.

Possible (effective) “sound objects” include: encounters between consonants and vowels, sustained tones that explore microtonal harmony, *melismae*, and *glissandi*, rhythmic patterns built on the repetition of simple phonemes, combinations of voice utterances that involve aspects of the classically trained singer (a fully supported sound or a rich falsetto) with others that are far from that kind of sound/voice “vocabulary” (for example singing inwards, or fine details of unvoiced sounds of the vocal tract, that are possible to use due to the microphone), (Fig.4).

Possible “theatrical actions” include: reading of a text (game like construction, and deconstruction of phrases using words stored in the “buffer”), sound production from daily activities (for example washing the teeth, laughing, crying or playing with sound toys).

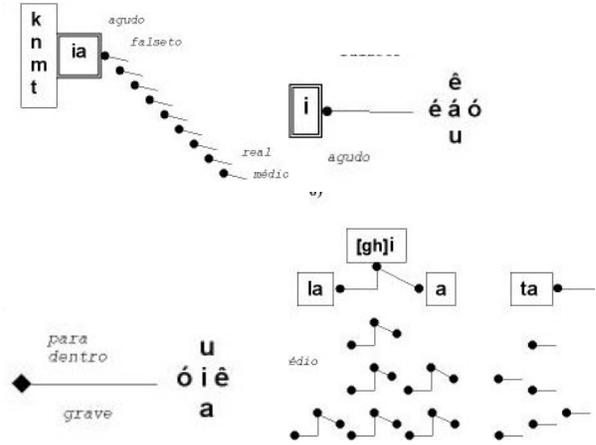
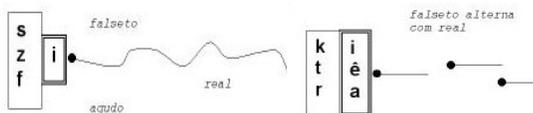


Fig.4 Aspects of the “score” of CyberSong.

#### 4.2 The role of the singer/actor in the manipulation of the electronic circuits in the CyberTails

The singer/actor produces his own “sound objects” that can be stored in the computer. The idea is to create constantly new “sound objects”, that arise from the combination of new events, with other events that have been previously stored in the computer, and triggered by “play” or “loop on”. It is important to observe moments in which there is just the sound of the real voice or just the sound of the voice stored in the computer.

#### 4.3 The role of the second performer

The second performer has direct access (in the Max “patch”) to the same parameters that the singer/actor controls, plus a sub-patch that controls reverberation. Initially this was, too, part of the CyberTails, but experience showed us that this was something quite difficult to control and that the number of different actions to be performed, by the singer/actor, should be kept within his possibilities. The second performer has a very important role and the piece is truly a dialogue between both performers. It may be necessary, however, to agree upon specific parameters that just one of them will control, or plan specific moments of non-dialogue.

#### 4.4 The structure and duration of the piece

It is open: there are no restrictions. Our presentations, so far, have been around 10-12 min. The content and structure has had many forms: the theatrical actions, the objects used, the texts (Schopenhauer, Dawkins or a sentence in a newspaper or heard on the street). We have been always looking for contrast and a sense of balance between sound densities, types of “sound objects”, theatrical actions and silence (both musical and visual). We have also worked on a general sense of direction, mainly within partial sections rather than on the all. This sense of direction is frequently the consequence of using “evolutive” processes as the basis for structuring the sound material.

## 5. DISCUSSION

Another important fact of CyberSong is that allowed the singer (Paulo Rodrigues) to expand his notions of performance, as a whole. Coming from a classical/operatic background, CyberSong allowed a totally new approach to voice production, yet using also “classical” resources, and also “character” development. The “character” emerged not from text or drama but as a consequence of dealing with the new situations made possible by the interface.

The reaction of audiences to a performance of CyberSong has been one of the most interesting aspects of the project. It seems to divide people. Some really enjoy the strangeness of the entire situation; some others find it difficult to accept. This has been the case regardless of the performing environment concerned. Some people extrapolate the pure musical and theatrical aspects and produced interpretations of what they see and listen, some others don't do that exercise in imagination. The following are the impressions of Rui Eduardo Paes, one the main portuguese writers, critics and journalists specialized in experimental music, [9], [10], [11]. “CyberSong, by Luís Miguel Girão, Paulo Maria Rodrigues and Rolf Gehlhaar, establishes a continuum between the cybernetic man of our time, with its extensive electronic tools, and the classical tradition of music and theater expression – the singer/actor in tails. But not in a linear, pacific way, as it happens with all the other continuums that connect some contemporary arts to history and its paradigms, in a dependent way. CyberSong ironises the cybernetic condition, ironises the academic conventions (the singing in opera, for instance) and ironises the connection between the two worlds. It's not a post-modernist perspective of the “classical” artist situation in an era very much defined by its technology and by scientific themes, but a mocking vision of that same post-modernist perspective. CyberSong is a critical work, but done with a smile. It's an accusation, but with a good, very subtle, humor. A kind of soft protest song that doesn't name it's subject, letting the listener take his own conclusions, very differently from the militant music of the last century's sixties and seventies.

That's why I consider this work not as a product of the classical music establishment, even if Rodrigues and Gehlhaar are both academics, but as the result of an experimental point of view. The word is tricky in what regards the arts, because even some experimental artists speak about the tendency of this kind of approach not to be definitive in its proposals (read: not enough serious), but the truth is that the great innovations in music in the last century happened in this experimental front, which is now the place for radical creativity when all the avantgardes seem to have collapsed. Not very strangely, the experimentalist practices have popular origin, even if they also have a strong intellectual support. The reason is simple: the conservatoires and universities aren't usually very open to the new ways of doing and conceiving, because their purpose is to reproduce knowledge, not to create it. Of course, the exceptions are numerous, and you have here the proof, but they only confirm the rule. Even if Luís Miguel Girão had a classical education, he's also a non-idiomatic and jazz improviser, with the flute, his first instrument. The fact that he's not only a computer musician is very important to mention, because it implies the same distance to electronic composition and playing that these three artists have with their subjects.

You need distance to observe this way the cybernetic order of things, the classical dictums and the particulars of music creation, and Rodrigues, Girão and Gehlhaar have that capacity of looking (listening) from outside while being inside. That's not very common in the electro-acoustic music field, the Portuguese one included, with all its necessity to show academic status. The most interesting electronic music now made in Portugal comes from experimentalists, people with rock, dance or even non-music backgrounds (visual arts namely, from painting to design through cinema), people that in some cases don't even know how to read a score. CyberSong was presented in February 2005 in a festival, Palavras Descarnadas II, organized by an association of experimental sound and audiovisual artists, Granular, that wants to promote experimentalism, precisely, has a *modus operandi*, and the fact is that this piece found the best place to be heard, seen and understood. Maybe the language was a bit different, but the posture was the same...”

New directions of CyberSong will lead to a full cycle of cybernetic theatrical songs and also to the inclusion of other resources, such as image projection controlled in the same manner as sound is at the moment, [12].

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