

# Gest'Ação I: A hybrid computer music guitar performance mediated by instrumental gestures

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**Abstract.** *With all computer music improvements in the last decades, musical gestures started to be used as parameter for controlling dynamic processes that compound a musical performance. This article intends to describe the processes and methods employed in a composition of this type: "Gest'Ação I" for classical guitar and live electronics which uses a set of 'instrumental gestures' for the guitar as part of the musical performance. The intent here was to elaborate a musical piece that could join, in a free process, the idea of 'extended technique' to the "writing/instrument extended" using open-sourced musical software. This article briefly discusses the concept of "gesture" as defined by Wanderley (2000) and Delande (1998), especially concerning the guitar performance. It is also discussed the concepts of "extended technique" and "extended instrument" as defined by Padovani and Ferraz (2011). Here two open-source softwares were used: MuseScore2.0 (for the score writing) and Pure Data (for the audio processing in real time).*

## 1. Introduction

Since the rising of solid state electronics (with the invention of the transistor, in 1947), which made possible controlling the electric stream throughout another electric stream, a significant advance has been made in technology and communication. Amongst many areas of development, in 1990's, it has emerged a computational platform to create musical algorithms; the Pure Data (Pd), initially developed by Miller Puckette. Pd is distributed freely and developed by a community that has expanded it to a visual programming language of performative multimedia processes ([www.puredata.info](http://www.puredata.info)). It is currently possible to explore performative processes of computer music in real time using several types of sensors - which is also known by the term "live electronics". Among many examples of such type, there are the "hyperinstruments" (MACHOVER, 1989), which use traditional musical instruments coupled to "live electronics", to operate in a hybrid manner, in which the acoustic sound generated by the instrument also controls in real time the audio and/or synthesis process. This article reports a similar development; describing the process and methods employed in a composition of hybrid computing and instrumental music, named "Gest'Ação I", for guitar and live electronics. Starting from an inventory of "instrumental gestures", already established for guitar, we sought to elaborate a piece that unifies, in a free approach, the concept of "extended technique" to the concept of "extended écriture/instrument" making use of open software of music.

## 2. Instrumental gestures and the guitar gestures

The term "gesture" is directly related to "movement". When we think about our daily

life, the "natural gestures" are movements which depend on a series of external factors such as intention, attention and adequacy. In music, the use and function of gestures vary significantly and comprehend a wide scale of practices and meanings for the composer, for the performer and for the listener (WANDERLEY, 2000).

François Delande (1998) was the first one to create a categorization of gestures related to musical instruments after his observations about the instrumental practices of the pianist Glen Gould. This researcher elaborated the following categories: 1) Effective gestures: those related to sound production; 2) Accompaniment gestures: body movements that accompany the performance itself. (Ex.: movement of feet or head); and 3) Figurative gestures: gestures perceived by the listener and that has no straight correspondence to the performer's movements (Ex.: articulations, melodic variations). From that taxonomy, this study deals specifically with "effective gestures", among which it is found the "instrumental gestures". Those functions take place in the "gestural channel" where occurs the receiving and sending of information. On the guitar, most of the gestural channel is in the hands. Wanderley (2000) summarizes the concept of "instrumental gesture" as a specific modality of the gestural channel, complementary to the "empty hand gestures" and featured as follows: 1) It is applied to material objects and has a physical interaction with it; 2) On the physical interaction, specific phenomena are produced, where formal and dynamic development can be mastered by individuals; 3) These ones can become the basis for communicational messages and/or the basis for the material production of action.

Jonathan Norton (TORRES, 2011) explains that the fundamental principles of the guitar playing are basically the same, whatever the genre, and could be classified in: (1) instrument's supporting, (2) left-hand functioning, and (3) right-hand functioning. Among the three aspects, we are interested in those related more directly to the instrumental gesture. In relation to the left and right hands, the author defines three kinds of "gestural articulation": a) Attacks: articulations involved in originating the sound; b) Sustains: articulations involved in the intermediate phase of the sound; and c) Release: articulations involved in ceasing the sound.

### **3. Extended techniques and extended writing/instrument: the musical role of computers**

In a broader sense, in contemporary music, extended techniques could be defined as unusual techniques, i.e., ways of playing an instrument, or singing, that explores instrumental gestural and sounding possibilities that are uncommon or sparsely used, in a specific historic and aesthetic context (PADOVANI, FERRAZ, 2011). Especially in the second half of 20th Century, the practice of extended techniques started to have a more clear definition and systematic application. It was noticeable the construction of new paradigms around this subject, on one hand, aiming for the creation of complex and new sonorities, such as multiphonics or microtonal sounds; and on the other hand, as a compositional approach strongly focused on the instrumental mechanism and the gestural possibilities of the instrumentalists (IBID, p. 26). For the purpose of the piece here proposed, there are computational resources applied to the creation and performance as an interactive systems. In this context, a computer model can be created to track this performance which controls a sound synthesis processing in real time according to specific contexts of the piece. The most popular computer music software are, among others: Max/MSP, SuperCollider, Csound. These computing environments allow the possibility of creating a computer model that extend technically the traditional instruments in inventive and unpredictable ways (PADOVANI, FERRAZ, 2011).

### **4. Open software: real time audio processing and musical notation**

Most of softwares are developed commercially, and so, subordinated to the financial and market constrictions. Nonetheless, the last decades have seen a growing number of

software developed by volunteers and distributed for free. These are called free software and their code is normally opened. In this paper, we employ two open-source softwares, which are described as follows:

#### 4.1 Musescore

For the writing of the score "Gest'Ação I", we used the musical score editor Musescore. Released under Creative Commons Attribution-ShareAlike, this software is free and also open to the contribution of all. The version 2.0, released in 2015, reached great advances in capacity and quality. This software has proven to be a viable alternative to the properties notation software, more renowned, such as the case of Sibelius and Finale. Despite some clear advances in this new version, Musescore presented some challenges to the less conventional notation which was the kind we proposed in the piece here described. The program still lacks a wider set of graphic symbols for contemporary writing. Although it has a great number of symbols they are not flexible, not allowing certain fitting to some needs of writing contemporary pieces. One simple example is the lack of lines with arrows, or the possibility to manipulate the thickness of lines available. Fig. 1 shows an excerpt that could be better notated if there were the possibility to manipulate the direction, format and thickness of the lines and arrows.

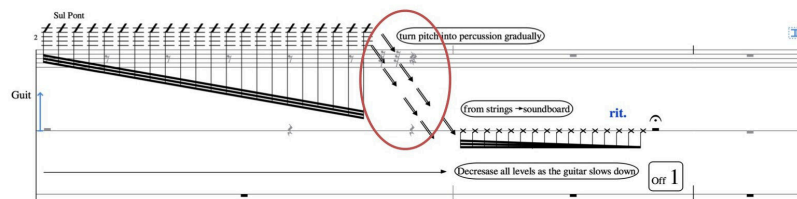


Figure 1. Excerpt of "Gest'Ação I" edited on Musescore 2.0

#### 4.2 Pure Data

Pd's programming exists by the manipulation and association of objects without the necessity of line codes writing. The algorithmic structures created with the objects are named "patches" and are placed on a screen named "canvas". The "patch" developed for the piece "Gest'Ação I" (Fig. 2) is composed of four modules that are executed and manipulated throughout the piece. The first one is a "reverb" which includes also the resource of "freeze reverb" in which in a certain chosen moment of time (a time window of milliseconds) the sound, and that effect acts as if being frozen, generating something like a continuous of that acoustic moment. The second module is composed essentially by two oscillators that receive the signal and allow the manipulation of pitch, velocity and depth. The third module simulates an usual effect in classical guitar, notwithstanding restrict to a very specific technique on the instrument; the tremolo. In this case, the effect could be applied to any kind of sound generated on the instrument, re-setting the notion itself of that specific instrumental gesture. Finally, the fourth module is a "spectral delay". The term spectral refers to the audio frequency spectrum, i.e., the distribution of frequency partials that compound each instant of sound.

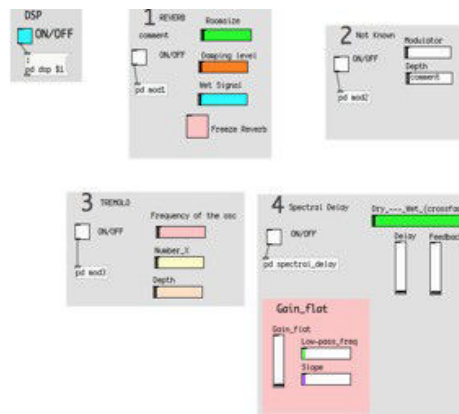


Figure 2. Patch of "Gest'Ação I" created on Pure Data Extended

## 8. Conclusion

This article presented the steps of development and conceptualization of the musical piece entitled “GestAção I” for classical guitar and live electronics. It is possible to understand this composition throughout two main perspectives, which we intended to relate at the end. On one hand, a very specific characteristic of the classical guitar – its gestures – is re-elaborate as part of its instrumental extended technique. On the other hand, there are a myriad of possibilities available by the computer music which make possible an actual timbre re-invention as well as the expansion of the musical context in which the instrument could be employed. We sought to use two open software tools to the pursuing of these goals, considering that the use of open software tools also points out to a new ideological paradigm and strategic path in the contemporary world where, each time more, we become more dependent of technology and, at the same time, a great inequality still remains in the access of this resource.

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