

The Ontological Meaning of Musical Interactivity

----- towards the aesthetic research of the musical interactive art

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Abstract

This paper discusses about the musical interactivity that is realized through the music descriptive language and the virtual musical instrument. The discussion has the structural and the ontological framework for musical piece. Three types of musical interactivity are noted: compositional-type, ensemble-type and mediating-type.

1. Theme

This paper aims at finding out the axis to discuss the musical interactivity. Musical interactivity is here defined as interactivity that serves for musical act (composing, performing, hearing, experiencing and so on), and which is realized by newly born digital technology.

2. Fundamentals of Discussion

The musical interactivity which is defined both from musical act and from technology is one of the information processing situation, in which some human acts are (both physically and mentally/intellectually) exchanged for another sequences of information which have the different meaning and context from those of the original acts. What occurs to music structurally and ontologically?

The modern concept of musical act like composing, performing, hearing has been formed in Europe since 14-15th century, which has been based on the musical practice. In the late renaissance and the early baroque era, composing was clearly conceived an independent act of performing and the musical practice has the unique form that is independent of the other social practice and the another art practice. *Musique pour musique* is supported by the modern musical practice that is ontologically realized by composing, performing and hearing, that is, objective and theoretical music structure gets ontological meaning by way of human musical acts.

I try to discuss here the drastic change of the ontological situation that has occurred to the traditional musical practice. The ontological change has a close relationship to the technological tools including the new instruments and the music descriptive software. And we can see that relationship in the musical interactivity.

2.1 Structure of Music ~~~ musical pieces as individual entity

Traditionally each musical piece has structure. One structure is based on the functional harmony, and another structure is based on pitch-set relationships as in the pieces of the atonal works by the second Viennese school, and the other is based on some statistic sound diffusion design as in Xenakis' works, structural levels in the Schenkerian sense and so on.

This is the first structure, structure in the sense of music theory.

Meanwhile, in some fields as Music IR or computer music science the structural phases of music are discussed, which made it possible to categorize the musical interactivity from another points of view; sound material, body sensing, human communication etc. Or, as is presented in the division of Ircam software, we can indicate five structural categories; sound processing, CAC, real-time interaction, spatializer, gesture-sound interaction.

This is the second structure, structure in the information processing type.

In the case that one piece which uses body sensing technology and gesture-sound-interaction application is the research object, the second structure is clear because of the technological situation, but the first structure should be discussed in the historical context of the contemporary music. What is the tone-structure? How is the synaesthetic relation between staging design or gestural design and the sound?

2.2 Ontological Levels of Music ~~~ musical pieces which are produced and received by human beings

I discussed about the structure of musical interactive art in the 15th International Congress of Aesthetics (2001). <Musical interactive art> is *music* in the sense that the piece is compound of the results of composing, performing and hearing, and that is *interactive* because the piece has some phases of interaction in various levels. I presented three ontological levels of interactivity, each of which effects on composition, performing and hearing.

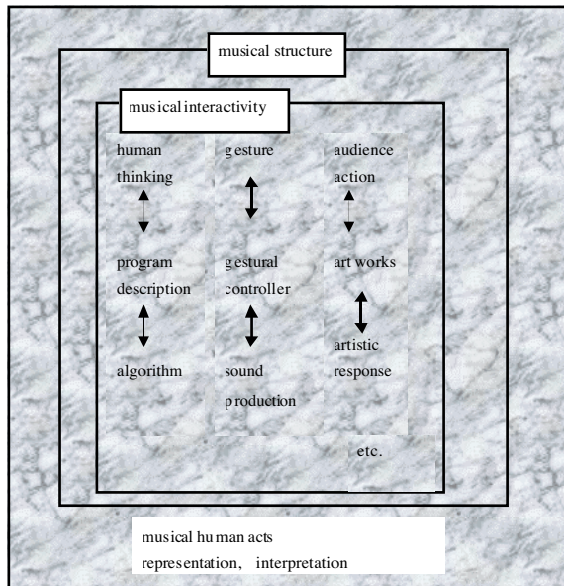
If we want to discuss the ontological levels of music interactivity, we should off course connect the interactivity to all the human acts of music, composing performing, hearing and experiencing. What is composed out in the case we use human communication tools (ex. network) and some CAC application? Is composing to construct gesture patterns or network design?

Furthermore, some phases of musical application of interactive technology or musical expressions that reflect the interactive technology should be pointed out. The musical interactivity has some specific variations of interaction because music has been traditionally a representative and performing art. *Representative* means that music has two steps of interpretative levels; from score to sounds, and, from sounds to meaning. And, to be a *performing art* means that music has gestures or motions that comes from human bodies. The problems of representation and performing art will be included to the discussion of ontological levels.

2.3 Interface Forms

As I said above, interactivity is one of the information-processing situation. So the problem is what kind of information is to be connected to which kind of information; from human body motion, biological information, sound information etc. to sound material, compositional logic, musical parameter and so on. This problem depends on the interface form and that is a hot topic to the information theory as in *Wanderley2000*.

In the following chapters, three type of interactivities will be specified. These cannot be noted if the researchers are concentrated only on the interface. I try to clarify the characteristic points of the three ontological music interactivities.



3. Musical Interactivity

Here I suggest three key concepts for the musical interactivity; score, ensemble and concert. These three words are all traditional music terms and they have already established their positions in the ontological levels of music. Score is the result or the descriptive record of composing, ensemble is the human relation in performing and is the visual information for hearing or experiencing the piece, and concert is a framework to experience *musique pour musique*.

3.1 Score

The score of the interactive musical art is not prescribed. The tonal structure of the piece is not decided before the performance, furthermore the situation is different from that of improvisation. Above, the composer's job is not necessarily writing the score but making the patches which are not necessarily the musical language, because the descriptive language Max does not provide music items (e.g. notes, chords) nor controls structures (e.g. counter melody, repetition). The patches, that is, score-like prescription made by a composer should have interaction with the performance. This is, ontologically to say, the compositional-type of interaction.

The structure in the sense of music theory is here open form as in the indeterminant pieces of John Cage. In the case of the piece of Pierre Boulez, for example in <Répons>, the structure is *partially* indeterminant. The second type of structure here includes all items of Ircam software, as well known as a representative art, the interactive music has multiple interactions, and there can be multiple design/realization from score to sound not by human interpretation but by way of the context programming.

3.2 Ensemble

As in Philippe Manoury's <La Partition de ciel et de l'enfer>, one player leads the ensemble but some optional phrases or sounds come out depending upon the patch (indeterminately), so score following system makes the

ensemble rational. This is the ensemble-type of performing interaction. With interactively composing MAX program, <La Partition> can be said to be technologically interactive. The real situation of the ensemble of the piece has more complicated than usual because it includes not only communication of players but also communication between human musical information and the processing by computer.

In traditional music ensemble form people share the common culture for the incarnation of the score. Different culture/genre has different ensemble form in order to make musical contexts. There have been metrum and phrasing for ensemble. But in some interactive contexts like <La Partition> the only relation that is established is that between trigger and the response in place of metrical rhythm or phrasing.

3.3 Concert

<Concert> is a traditional social form of music performance and hearing, and it remains to be discussed. The situation of interactive communication in/out of the concert should be discussed in relation with the methods and tools for sound description and aural perception.

Michel Waisvisz explored a new interaction. We call it the mediating-type of interaction. That exists between performer/composer and the audience.

Waisvisz's Operation LiSa(1996) is the name of his musical performance. He does not use the word <musical piece> for that performance because it is interactive between him/his machine and the audience.

LiSa (Live Sampling) is a realtime audio manipulation environment. The program uses the on-board audio hardware of personal computers, so it turns the computer into a versatile audio sampling machine. Complete program control is possible through MIDI, so the user can make a stage performance with it.

In Operation LiSa, the <interactive composition> is realized. The process of composition is quite different from that of Manoury. In the performance place, the composer/performer catch some sounds from the audience through the microphone. The sampled sounds are morphed by LiSa program in his performance. By The Hands, the performer hands and fingers can control MIDI note data, and The Hands map the distance between two hands mapped, for example, to the volume data. The audience knows that the sounds they hear during the performance are originally the sounds, which they themselves had made. In the musical performance, the sound materials stemming from the audience have interaction with the technological instrument (technological level) and with the performer/composer (human level). Until now the instrument The Hands has been performed only by Waisvisz, the founder. Waisvisz makes improvisational performance, so he is a performer/composer. The system is very personal but his performance has a new musical context that includes the interaction between creator and recipients. And it also has a prominent mediating form that liquidates the form of concert.

Reference

- [1] A Marcelo Wanderley, 5th CUIDAD Meeting - Ars Electronica99.
- [2] A Michel Waisvisz, Interview in 1997. In: Ongakugeijyutu 1997-9.