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I.B.R. Variation 1

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Abstract

In this paper I would like to introduce my recent composition: "I.B.R. Variation 1" (a composition for computer, electrified guitar, mixing board and human body), which is derived from three different projects—Illusions, Body Mix, Resistance—fusing three different and already unusual interfaces for musical expression into a powerful new musical instrument. The piece is implemented by employing computers and common sound synthesis/processing techniques in combination with a rather primitive manipulation and misuse of low tech analogue equipment. The main idea was to assign unusual tasks to usual pieces of musical "equipment," transforming a mixing board into an oscillator (input connected with output), a guitar into a digital controller and a human body into a mixing board. All parts of the instrument eventually form a complex feedback chain, exposing a mix of original electroacoustic material and feedback oscillations to a continuous (analogue/digital) metamorphosis.

Conception

Artistic Motivation

The piece is built on radically manipulated live guitar sounds. My intention was to find an original form of artistic expression, with disregard to common aesthetical ideals—a true artistic statement, without controversial compositional elements and artificial dramaturgic lines. Overlooking the musical substance—as it is of minor importance in this particular "composition"—and considering just the aspect of sound transformation, my first question is about the interpretation of a "flanger," a "distortion" or any other signal processor used in contemporary electronic music. It is merely an artistic opinion, an answer to the "non-processed" question, but does it actually make any sense? It can render a statement to be "optically" more appealing, or express a rough abstraction of a temporary state of mind but does this really qualify a method as a valuable creation of art?

Figure 1. Cables soldered to the guitar frets

I.B.R. Variation 1 is an attempt to find the real, or at least one version of a true artistic action, therefore the artist physically becomes a crucial part of the new instrument and furthermore its own "signal processor." The unique conduction characteristics of his body determine the aesthetics of the audible appearance, which may be experienced as objectionable or rather disturbing, but in the end, the truth's unpleasantness is not even the artist's "fault." Moreover, the specific instrument design "forces" the player to preserve a natural balance of tension and resolution throughout the piece, by experiencing an immediate, tactile response, i.e. the painful sensation of electricity as a consequence of every musical stimulus that he is generating.

The Audio-Visual Transformation

The question of the embodiment of synthetic sounds is one of the biggest problems that (serious) electronic music has to deal with and is in general blocking the path to its acceptance. The embodiment, which *I.B.R. Variation 1* is trying to introduce is not another attempt to transform audio into video, but into a manifestation within the artist himself, who is not sitting behind the computer, playing the mouse and deepening the mystery, but exposing himself "naked" to the "listener"—as it was the case with traditional instruments throughout the history—demonstrating passionate but well articulated instrument playing. Although the instrument is not capable of controlling most of the aspects of its audible output, it is highly sensitive to the smallest action of its player, which makes it an authentic audio > visual transformation device.

Central Artwork

It is difficult to see the true essence of the work since it is dealing with raw and almost uncontrollable source material, furthermore the main processor (the artist) is lacking in parameter knobs and sliders. *I.B.R. Variation 1* is the first composition for this instrument, but since the performing is improvised, it is not really a musical composition and finally it is not even music that is being generated. It can be perceived as an inaugural overture or an exposition of expressional power and variety. The real artwork is not happening at the time of performance but long before—when the essential idea emerged—not as a result of an experimental approach but as a consequence of pre-empirical cognition of empiricism, based on elementary understanding of simple physical laws. Therefore the central artwork focuses on the conceptual thinking process, which is simultaneously representing the key for an authentic and comprehensible artwork experience.

Compositional Aesthetics

The goal was to search for aesthetic values in the hardware itself. The implementation of this particular altered constellation of mixing board, guitar and computer produces unusual results, which could be understood as purely immanent material, but on the other hand they are deliberately provoked, common aesthetical disruptions or system malfunctions, shifted from the negligible fringe of our attention to the centre. In a perfect world this would generate specific, foreseeable behaviour, but since a series of electronic components, especially amplifiers and even the buildings electricity network (unavoidably introducing noise as a natural "random" source) are involved also, mistakes of any deliberate "mistakes" may occur. As already mentioned, music (a product of conventional employment of audio technology) does not play a role in this composition. However due to the previously defined phenomenon of "mistakes of mistakes" (errors of errors), the instrument has the potential to produce recognizable passages of "music." The electronic circuit closes after a series of potential obstacles, A/D/A conversions and indirect (amplified) junctions, resulting in a nonlinear and audible circuit twist. Complex harmonic and rhythmic patterns create the illusion of temporarily recognizable musical structures, which are not intentionally targeted but as they have the power to create a confident, socially and historically enforced certainty and thereby positioning a bright spot amidst the confusing mess of a voluminous sonic sculpture—they may represent a substantial carrier of aesthetic significance.

The Hidden Purpose of the Interface

Creating unconventional interfaces for musical expression is my strategy to pave the way for an unprejudiced perception of the vast variety of manifold audio art—usually approached with ignorance. A new interface—with a clear reference to a traditional instrument (the guitar)—attracts the spectator's attention in the first place and may gradually establish a form of "white space" where cause and effect are not engaged in polemics and new sounds are ready to be experienced with an augmented awareness for the detail.

Technical Description

The Instrument

The instrument consists of an analogue and a digital "section." In first instance, the electronic current generated by an electro-acoustic guitar runs through the player's body, entering via a cable "connected" to his mouth. The electronic current (= the music) then travels through his body, out of his

fingers, through the guitar strings and finally out through eight audio cables soldered to different guitar frets. With this process, the original guitar sound is being re-coloured in a very unique way and continues its "journey" into the computer for further processing. There it is being manipulated and combined with completely synthesized sounds, without the use of any additional interceding interfaces.[1]

The Analogue Part

The analogue section involves a few pieces of ordinary technical equipment, rebalancing the categories of their primary implementation purposes among themselves.

The Guitar

There is no special significance in the guitar playing and especially in its audio output. Rather, it is employed as a tool for generation of some commonly familiar source material.

The Mixing Board and the Human Body

The input and output of the mixing board are connected indirectly, with a piece of human body between the two, creating a variable conductor, where the amount of flesh being crossed by the electronic current represents a potential barrier and the main adjustable parameter. Consequentially, the pitch of the oscillating "human mixer" is being changed according to the temporary current strength, allowing the use of the complete tonal spectrum.

Figure 2. An example of mergence with the instrument

The Digital Part

Eight cables are soldered to the frets of the guitar and connected to separate audio inputs on a computer audio interface. By touching the frets (cables) while playing the instrument, a weak electronic current is being induced—a so called "ground loop," which occurs as a consequence of a potential difference between the artificial "0" created by the electronic equipment and the real "0" (ground), the musician is standing on. This electronic current can be interpreted as an electronic abstraction of sound. Any kind of sound is always accompanied by a distinctive volume (amplitude) envelope, which can be detected by an "envelope follower" in the real time, PD (Pure Data) software. By quantizing the follower's spectrum into a "High" and a "Low" level, the gained data is translated into two discrete values ("1" and "0"). This eight bit information (from eight cables and frets) controls all the parameters of an FM synthesis based instrument, employing five oscillators with the basic waveforms.

The Collision of Sound Sources

The guitar's and the mixing board's feedback signals merge in the musician's body, which includes the guitar sounds into the oscillating process of the mixing board and harmonically enriches the overall sonic appearance. On the other hand also the tonally wide ranged and generally monophonic melody generated by the mixer gets pulled into the computer, revealing the hidden, immanent aesthetics of the twenty two channel, computer audio interface. Usually both devices (mixer and audio interface) do not play a significant role in a musical invention but are rather residing discreetly in the background and ensuring just a qualitative aspect of the pre-composed material. The accessible tonal spectrum of the oscillating mixing board can easily exceed twenty kilohertz, which humans cannot directly perceive. Due to the imperfection of the audio interface—the input filters and the sampling

process itself—the phenomenon of aliasing appears and answers the question of an active involvement of principally redundant technology in the compositional process.

Conclusion

I.B.R. Variation 1 can be understood as a picture of an individual attitude and reaction to the suggestive influences of modern society. With his "body" an artist is absorbing and creatively processing the impulses of society, which is abstracted through a traditional instrument—the guitar. The resulting sounds are unconventional and represent the processed and reorganized "data" which one is confronted with in *everyday life.* It also just sounds like the unique individual.

Related Work

Toshimaru Nakamura's *No-input Mixing Board*, where the inputs are directly connected with the outputs of the mixing board and no external sound source is supplied, shares some common features.[2] In *I.B.R. Variation 1,* the crucial difference is the artist's physical inclusion into the electronic feedback chain, introducing a third transformation (audible > visible > sensible). Another related work is Stelarc's *Split Body: Voltage-in/voltage-out*—one of several pieces investigating the collision of electricity and the human body.[3] He uses electricity to move and manipulate his body though, which is just the opposite of *I.B.R. Variation 1,* where the body is used to manipulate the electronic circuit, consequently generating audible events.

Notes

[1] See also Steven Marshall, *Electric Musical String Instruments and Frets Therefore,* Patent Nr: US4748887 (6 Jul 1988).
[2] On Toshimaru Nakamura, Sachiko M, Otomo Yoshihide and other Japanese radical improvisers, see: http://www.japanimprov.com
[3] See: http://www.stelarc.va.com.au