I.B.R. Variation III

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ABSTRACT

In this paper I would like to expose the conceptual fundamentals behind my recent composition: *"I.B.R. Variation III" (a composition for computer, cathode monitor, mixing board and human body)* and furthermore, reveal the functionality of the interfacing methods employed. I will try to outline the complex structure of interwoven artistic and technological ideas, which should prevent any misinterpretation of the actual artwork, as it can easily founder amongst the ambiguous terminology usually used to interpret a first encounter with the composition and the instrument it is being performed on. The instrument consists of a few different interfacing concepts, all of which have individually been introduced in earlier compositions [3]. Since its first presentation / performance at the "Totally Huge New Music Festival / Conference - 2005" in Perth – Australia [4], the interface is continuously evolving and providing creative impulses for new compositional variations along the way.

1. TECHNICAL DESCRIPTION

1.1 The Instrument

The instrument fuses sophisticated (digital) sound synthesis / processing techniques with a rather primitive manipulation and misuse of low-tech analogue equipment. Thereby it is able to compensate the auditory constraints of its analogue components with the endless possibilities of digital sound synthesis. The main challenge however was to develop an interfacing method, which would reconcile both approaches (digital and analogue) in order to establish a neutral platform (a performance environment) with a homogenous appearance and manifold expressive potential.

1.2 The Analogue Part

The analogue section involves a few pieces of ordinary technical equipment, pulled out of their original context. Through quite unusual electronic connections between the mixing board, TV monitor and the body of the performer itself, a complex audio-visual feedback chain is established. The special significance about this part of the interface is the fact that all forms of gestural interaction are closely coupled with the specific aesthetics of the sounds they induce. This particularly inflexible instrument design does clearly define the borders of the overall sonic appearance, whereas it does not necessarily thwart the power of musical expression. Though it is still possible to tune the parameters of the mixing board and the TV monitor at any time and get a relatively wide repertoire of different waveforms, I define those actions as a lower-level performing process, as all attention is pointed towards the actual (first level) instrument playing that follows.

1.2.1 The mixing board and human body

As an extension of the "no input mixing board" concept, utilized by artists like [2] and [7], the input and output of the mixing board are connected indirectly, with a piece of human body in-between. Hand-sized metal plates are connected to the inputs and outputs of the mixing board providing contact surfaces for the musician. Due to electrical conductivity of the human body, a feedback circle gets established. The basic waveform is defined by the filter and volume parameters on the mixing board, whereas the main pitch is dynamically controlled by the varying feedback-chain resistance the musician can produce by changing the size of the contact surface on the electrodes (metal plates). This enables fast access to the complete tonal spectrum.

In the extended version of the composition, a second musician joins in and the electronic current goes through both actors. Here one inconspicuously grabs the input cable and the other the output cable of the mixing board. Sonic events occur, when they start to touch each other, which manipulates the feedback loop according to the strength of their contact. A very similar instrument called *"the sexophone"* - (DIMI-s) was designed, by Erkki Kurenniemi in the year 1972 [9]. The DIMI-s was a digital instrument with a clear distinction between control and audio data, and only two of them were ever built. With my work, I would like to preserve and recycle this powerful interfacing concept, with a much more primitive implementation – through a mixing board alone – that could ensure easy access to a broader electronic music community.

1.2.2 The cathode monitor (TV)

A conventional cathode monitor – a TV is also a part of this instrument and has two functions. By connecting the analogue output of the audio mixing board with the video input of the TV, the sound can be visualized in form of image distortions. In order to get a diverse colour spectrum of distortions, the audio signal has to be combined with a video signal, which is accomplished with a simple (passive) "Y" component, joining both signals just before the video input. The most interesting thing however, is how the TV is employed to contribute to the functionality of the gestural interface, which already was discussed in a previous paper [5]. Here the TV is just another component in the feedback circle, where the radiating screen is used as the output "port". Amazingly the audio signal, fed in the monitor's video input, maintains its original character when passing through the TV's

signal path, and can be picked up by an electrode (an audio mixing board input cable) right before the radiating screen. By changing the distance between the monitor and the electrode, the volume or - in case of a feedback circuit - the pitch of the oscillation can be controlled. This distance represents a variable potential barrier (i.e. a resistor controlling the circuits electronic current strength), which the electrons - sourcing from the radiating screen - have to overcome in order to establish the feedback loop. The drain-electrode however, should not be physically moved, but rather connected to the musician's body. Thus he is able to play the instrument by changing the location of his body within a proximity range of about four meters.

Figure 1. a musician playing the instrument is connected to the electronic circuit through a cable in his mouth

1.3 The Digital Part

The specific (cable-rich) design of the analogue section had a great influence on the design of the digital controller. Eight common ¼ inch audio-cables - connected to separate audio inputs on a computer audio interface - are fixed on the table in keyboard-like setup. By touching the cable tips, a weak electronic current is being induced, caused by electronic environment noise, the building's electricity network, the ground loop, etc... 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 software PD [8]. By quantizing the follower's spectrum into a "High" and a "Low" level (the cable is touched or not), the resultant data is translated into two discrete values ("1" and "0"). This eight bit information is controlling all parameters of an FM synthesis based instrument, employing five oscillators with the basic waveforms.
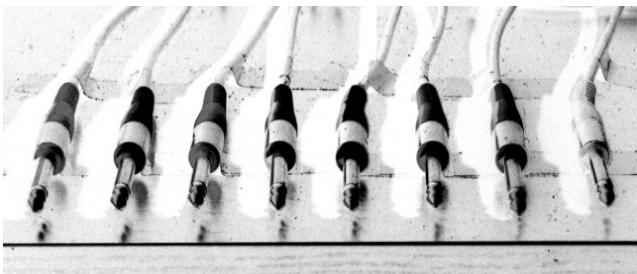

Figure 2. the digital interface – eight, ¼ inch cables

2. ARTISTIC CONCEPTION

2.1 Electronic Art

Nowadays, the term "electronic art" applies to a large body of diverse artwork, though we could agree that many pieces (especially in the field of music) are declared "electronic" just as a result of compensating traditional art practices with the latest technology. In my approach however, I would like to abstract from any preconceptions and historically established notions of electronic art and focus on the term itself. It is the idea of using electrons as basic building blocks of an artistic expression and consciously manipulating their dynamics inside an electronic circuit. Here the process of composition is confined to the definition of different electronic potentials and their interconnection. The resulting sound is then just a secondary product of artistic actions (i.e. playing the instrument). It is a direct sonic manifestation of electronic motion, respectively a very simple transformation of active electronic current into membrane movement. This migration to a "lower" level of composing may define strict borders to a conventional approach to composition, but on the other hand it fosters sonic exploration and contributes to a greater awareness of expressional power of the electronic age. Furthermore, it can make it easier to overcome the acoustic paradigm, implied by traditional music notation, where sonic events are defined with regard to mechanical and physical constraints of acoustic instruments respectively their players. David Keane [6] suggests that even the advent of computers could not accomplish a paradigm shift; instead, some composers and sound engineers are still trying to generate electronic sounds that could pass for an acoustically generated original. Amazing.

2.2 Form

"I.B.R. Variation III" is an improvised, thus a nondeterministic composition (in a "classical" sense), where only the hardware setup and the signal paths are predetermined. Although it is improvised, the question of form and structure still remains a big issue, creating a tension between the *structure*-oriented and the *process*-oriented approach to composition. The basic idea is to break the virtual linearity and predictability of the musical tension-resolution interplay, usually encountered in compositions or improvisations, and to introduce additional empirical factors (visual and tangible) upon which the temporal organization of compositional elements could be based on. Moreover, the priorities of those reference factors should be rebalanced with respect to the usually predominant (actually exclusive) aural impression. Due to the physical inclusion of the musician in the electronic circuit of the instrument, he is able to experience a tangible feedback accompanying any sound he induces. In fact, he gets to feel the actual sound itself through its electronic abstraction (the active electronic current, which is primal in this case, since it is electronic art…). In extreme situations, the source electrodes can generate up to 14 volts (RMS), which causes a rather painful experience especially if the musician puts the cable into his mouth. Consequentially, the aural aesthetics and functionality of elapsed sonic events loose their forefront position in the upcoming sonic event selection procedure. Of course this is true not only for the horizontal density development (time domain), but also for the vertical density (momentary signal structure and velocity). Thereby, the composition *structure* is conditioned through the real-time *process* of the actual instrument

playing, though the *process* is not supposed to enslave the *structure*, but merely to reduce the composer's free will in aural thinking. However radical the temporal sound arrangement may appear, the composition is still endued with a well balanced local and global rhythm of tension and resolution, only that it is originating from an alternative reference.

2.3 Aesthetics

The particular sound aesthetics is conceptually linked to Arnold Schönberg's ideas of truth vs. decoration and "must" vs. "can" or skill vs. necessity [1], which already starts to reflect itself in the global temporal structure, where the parts with decreasing energy (vertical density) are strictly deterministic, and the whole differential progression of the composition loosely defined by the very first concrete and solely-pure arbitrary action. The idea was to expose the intrinsic aesthetics of the immaterial (sound, picture, electricity) interdependence of all the material components engaged in the creative process, starting with the exploration of the employed hardware itself and the spontaneous output it generates while being alienated from its originally designated function. It is a pre-empirical approach (without the possibility of prior judgment on the overall acoustical appearance of available compositional material) aimed towards a primitive but true exposition of the electronic instrument's "body" and its own – authentic character. To give a concrete example on a crucial component of an electronic instrument: *the speaker*; it is easy to see the surplus in addressing its expressional truth through an approach in the electronic domain – by generating authentic signal forms, rather than to harness its (undisputed) talent of either projecting or imitating acoustic reality, which despite all efforts and improvements will never be able to achieve convincing results when compared to the original – the acoustic generator. This immanent aesthetic material is strongly coupled with the specific nature of electronic devices or parts of an electronic instrument. It is always present, but commonly considered as an imperfection, that needs to be suppressed. I however think that it is extremely interesting material, so I try to isolate and highlight it. It is not an artificial, but a real and a purely natural form of expression, reflecting the constitutive causes of the device's functionality. My work as an artist is to find and to expose it – the natural aesthetics, which should then stand for itself.

3. CONCLUSION AND FUTURE WORK

The development of technology is progressing with an increasingly rapid phase. The computer music industry is continuously producing new "black boxes" that are inconspicuously taking over control of an increasingly larger field of compositional aspects and slowly pushing the job of the composer further into insignificance. With *"I.B.R. Variation III"*, I would like to make a step forward by making a step backward and to approach the world of electronic composition at its fundamentals. It requires quite some discipline to resist the intriguing expressive potential of modern audio technology, available at a moment's notice but at the same time, it makes me think of Kurenniemi's beautiful thought: "Technology won't take control as long as man can misuse it" [9].

The Instrument is still in its early testing phase and due to its functionality – in particular its haptic feedback, the form of improvisation is the only possible embodiment of a composition at this point. To utilize the concept of traditional and especially of idiomatic composing, which in this case would need to be extended into a higher dimension space, is certainly a challenging objective for the future.

4. REFERENCES

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