Re-realizing Philippe Boesmans' *Daydreams*: A Performative Approach to Live Electro-Acoustic Music

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Abstract

The author's realization of Philippe Boesmans' Daydreams, *for marimba and electronics, was a study in the musical relationships between performers and computers. This realization can be used to reflect a performer's interpretation of the score through a performer-oriented user interface. The new version honors the composer's intentions but eliminates the need for excessive hardware devices and adds various nuances that allow mutability and performability. The author suggests that a realization is a performative tool for musical expression.*

1 Introduction

I am a percussionist who performs regularly with technology. I often find this a frustrating process, because technology has many limitations when combined with music. A tape has no means of knowing the intentions of a performer and usually neither does a live electronic interface. This is quite a restraining way to perform. Computers are not humans and seldom are there tools within live electro-acoustic environments that allow adjustments for interpretation, the acoustics of a hall and even account for flexibility in tempo, dynamics, and timbre.

When learning an electro-acoustic piece, performers need this type of freedom. It would be satisfying to play Saariaho's *Six Japanese Gardens* with the ability to augment certain sounds in the audio files to better match the percussion instruments chosen, or for a clarinetist to be able to push and pull certain sections of Smalley's *Clarinet Threads* to account for the reverberation of the hall and the quality of the speakers.

A piece like *Daydreams* requires this approach in order to succeed. (Boesmans 1991) It was composed for marimba and live electronics in 1991, an era where live electronic interfaces were quite primitive. It was this infancy in technology that made the piece so cumbersome to reproduce. The original inception was designed for several hardware devices, some of which were specifically forged for the piece, and others that were too awkward and expensive to use.

Despite the substantial amount of technology, the realization did not account for the mutability needed for future performances by other percussionists. Most importantly, it did not work for the technology that I used. Consequently, I re-realized the piece in 2003, flattening the technology to a computer and two microphones, and re-forging the signal processes to collaborate with my interpretation. I discovered *Daydreams* did not have to sound as it did thirteen years ago. It could have my own aesthetic print tailored to my style of playing and could be altered and adapted for different players, instruments, and acoustic situations. Re-realizing *Daydreams* was a study in computer/performer relationships, and a vehicle for personal musical expression.

2 The Technology

Daydreams was premiered by Wim Konink, realized at Centre de Recherches et de Formation Musicales de Wallonie in Belgium by Jean-Marc Sullon, and updated in 2002 by Patrick Delges. The heart of the control method for this piece was a MIDI interface designed for the marimba that converted an analog signal, taken from small piezo-ceramic pickup microphones, into MIDI data that identified pitch and velocity. This pickup system, although quite powerful in its design, was a very complicated means to track a marimba. The pickups had to be glued to the nodal point of each bar and subsequently plugged into a collection rail installed on the horizontal supports of the marimba.

The information received was sent to an analog-to-MIDI converter, and a computer parsed the appropriate information based on an event sequence programmed in a beta version of Max. The event sequence was essentially one hundred and seventy-two sub-patches that routed the MIDI data to a sampler and a reverb unit. The sampler was responsible for the signal processing which performed such tasks as pitch bending, echo effects, and glissandi as well as sequence pre-composed MIDI files. Other hardware devices included: a Yamaha DX-7 (MIDI foot pedal interface), a MIDI merger (to merge two pickup systems), a MIDI filter (filtered loud dynamics that bled into other pickups), and a display system for the performer.

However, the most ambitious task was spatializing the piece for six speakers. In 1991 spatialization was in its youth and did not yet have the software support it does today. Ultimately the original engineers developed their own hardware that performed to their needs.

The 1991 design was not only ephemeral but expensive and lacked portability. It was my initial intention to reduce the amount of hardware and software dependency to the absolute minimum. I settled on using what I call a Simple Interactive Music Performance System, or shortened to SIMPS, that could not only ensure future performances of the piece, as technology shrinks and quickens, but could also be used as a standard system for live electro-acoustic performance. The system I used was a laptop computer, 8 channel audio I/O device, two condenser microphones, and a foot pedal. Based on Patrick Delges' and Jean-Marc Sullon's original realizations, the interface and signal processes were programmed in Max/MSP and controlled by a pitch tracker (fiddle~) in conjunction with the foot pedal. (Puckette, Apel 1998) The updated spatialization programmed by Patrick Delges was preserved in my realization. This was the simplest method for solving the technical problems the piece presented.

2.1 The Music

Daydreams is a thirty minute work that uses technology to explore the phsysical and musical boundaries of the marimba. The piece is constructed into six large sections of which are all somewhat derived from the material of the first two. The music alternates from very complex to very simple. There are sections that sound almost chaotic, but are balanced with chorale-like sections that are beautiful and surreal. In general, Boesmans uses technology both aesthetically and compositionally as certain phrases are transformed or developed by the acoustic extensions the technology has created. In its simplest form, *Daydreams* moves the listener between realistic and fantastical environments.

3 Aesthetic Relationships

Since we cannot expect technology to respond the same as a musician then we must create the illusion that this relationship exists. Performing a live electronic piece requires such an interpretation. The computer must be an extension of the acoustic instrument, and the performer must treat it in this way. Within *Daydreams* this idea lies within the delivery of several musical contexts divided into four categories: additive texture, dialogue, collaborative texture, and note-to-note interaction.

Additive texture can be defined as material that does not directly interact with any specific event or phrase. The first examples of additive texture arrive approximately five minutes into the piece at one of the most complex rhythmic and harmonic sections. The computer creates clusters of marimba samples that reflect the harmony of the phrase but are hidden beneath the texture. Essentially, the computer plays notes that one performer cannot execute creating an effect of multiple performers.

To make this illusion viable, it was necessary to update the signal processes for the piece. Since in 1991 a sampler could only hold a limited amount of audio files, the sound quality of the MIDI sequences was quite poor and did not particularly blend well with the acoustic sound of the marimba. Recording a sample for each marimba note, and not just two notes per octave, was a simple and easy solution to make the MIDI sequences sound more natural and less synthetic.

The second musical gesture, dialogue, involves a conversational relationship between the acoustic and electro-acoustic sound. The material strives for a causality of gesture-to-response where each musical aggregate either collides or connects with the other. (Smalley 1996) For example, the performer may play a loud chord that is followed by a fast progression of chords. This gesture provides the illusion of discourse between the performer and the computer. The effect defines an alternation between worlds which is seamless yet distinctive. It should appear as though the physical gesture of striking a chord was in fact the beginning of such a progression. Conversational interaction is achieved by triggering the appropriate MIDI file on cue. However, it was important to have the freedom to change the speed of these rapid chordal progressions which was why using MIDI files was so helpful; you can alter the speed without altering the pitches.

In contrast, collaborative texture in *Daydreams* is often juxtaposed with various elements of additive texture, but exclusively involving the transformation of sound. The acoustic sound must blend into the computer processed sound. A common example is rolls, or tremolos, that lower or raise in pitch much like a glissando. Many times this happens during an extended section of multi-layered rolls (some sections are up to ten voices with marimba and computer combined) and includes voices that slide in pitch to fuse and combine with other layers. This becomes collaborative by the nature of the voice's motion and the homogenization of the texture. The acoustic sound hides within this texture, while still attaining musical identity and shaping the desired effect of pitch sliding. Overall, the essence of collaborative texture resides within the release of the marimba's acoustic boundaries. *Daydreams* strives to unite the divisions between reality and fantasy therefore the performer should take the same role in relation to the computer by respecting these details.

However, while considering the nature of collaborative texture it was obvious that one sample of every note did not fully satisfy the desired effect of the MIDI sequences. Using the pre-recorded samples made the rolls sound brittle with too many high frequencies. The simplest solution was to create another bank of samples with a rounder attack

envelope and slightly processed for greater resonance. The computer used this sample bank whenever a MIDI file required this effect. The result was a more organic sounding roll.

Though collaborative texture is quite extraordinary the most visible means of a gesture-to-response relationship is note-to-note interaction. A common example of this is pitch bending that occurs either on a single note or groupings of two to four notes. These events are designed to give the illusion that the marimba is capable of such behavior and extend the listener's expectations of the acoustic abilities of the marimba. Pitch tracking (fiddle~) was used to control this type of interaction.

The 1991 realization used a separate sample for such treatments that had a greater sustain and allowed enough resonance for the listener to hear the pitch bending. However, due to the slight latency of the pitch tracker, using the original sample was not completely effective because when one note was played there were two attacks: one from the acoustic marimba and one from the computer. A better solution was to crop the attack of the sample and fade into the bend. The listener would ultimately hear a summation of the two creating a clear bending in pitch.

It was apparent from the beginning of this project that I had to create a realization that could perform all the tasks of the original but did not necessarily have the same sonic limitations. These aesthetic decisions were made based on how I wanted the combined media to sound but at all times staying within the boundaries of the score.

4 Performance Variability

No two performances are identical, and it is always difficult to adapt a computer application to a new environment and especially a new performer. My intentions in the realization of *Daydreams* was to provide enough malleability in the signal processing that another performer could shape the sound to his or her interpretation.

A marimba can vary dramatically in sound, as can performers. When realizing *Daydreams*, I had to design the behavior of the patch to be adjustable based on factors of this kind. Since the piece is so often dependent on the congruity of electronic and acoustic sound, it became absolutely necessary to have this capability.

The samples are the simplest variable in *Daydreams*. If someone were to play this piece using a brighter sounding marimba then they would need to record new marimba samples. Moreover, another performer may want the rolls, from the sequenced MIDI files, to have different qualities based on the musical material of a particular section. To alter this aspect, one could make several sample banks that vary in envelope and level of attack. Such an inclusion could be amazing and encourage consistency with the computer's sound but most importantly, sustain the piece's development of reality and fantasy.

Volume and speed are also simple variables. Since the musical material is often the playback of MIDI sequences through a sampler, the performer can change their tempo and dynamics. Performers all play differently and have different needs based on their interpretive and technical skills. Within *Daydreams* there is room for expression. The performer is not limited by an audio file's permanence and can shape a phrase with relative ease. Since dynamics and tempo are underlying musical tools for musicians, the same devices can be used to phrase the MIDI sequences.

A performer may also want to adjust the relative timbre of the samples based on various situations and interpretations. This can be done using a single pole low-pass filter giving the samples a darker sound quality without distortion. As long as the initial cutoff frequency is not too high this technique can make the samples sound quite brilliant and can be altered at the performer's discretion. This effect is subtle and often not effective for louder passages. It is best when used on pianissimo rolls or sustained notes.

Another aspect is pitch bending that occurs during note-to-note relationships. If the length of the glissandi are always the same, the effect becomes static and no longer takes its illusory character. The performer can be quite musical with this effect. This feature creates a natural relationship between the acoustic and electro-acoustic environments and magnifies the implied psuedo-reality. The figure below shows the architecture of the pitch bending.

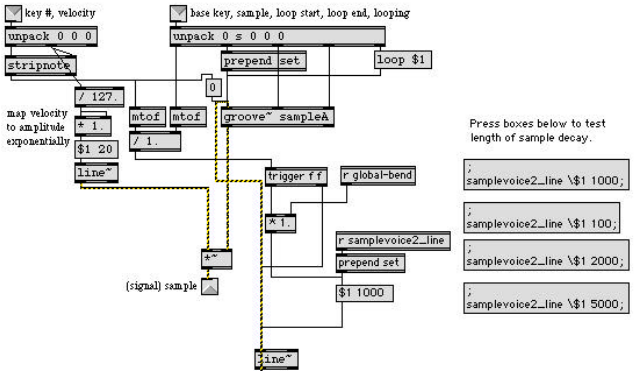

Figure 1

The pitch bending method in Max/MSP. Uses groove~ to change speed of sample.

However, the length of the glissandi do not completely make this connection; rather it is the envelope of the pitch bend. The pitch bending method can very easily take the values of a table that store a desired bend envelope. The performer can pre-program different tables with different shapes to reflect the musical qualities of the phrase. For example, one could allow for a longer resonance but a sharper bend ratio for a more vocal-like quality. This is quite a fascinating effect in that the performer can physically appear to be shaping the glissando much like a

string instrument. It is quite fantastic to see a performer's physical gesture create a sound that the listener knows the instrument cannot make.

5 Conclusion

Daydreams is by no means a finished realization. The piece is capable of even more variability and facility. In the future I would like to add certain features that could account for various situations. Concert halls vary from large to small, and the quality of speakers and sound systems can never be dependable. It would be helpful to make presets for the reverb levels, MIDI sequence speeds, volume and the motion of the spatialization that match the acoustic properties of the hall. As well, performers may find it difficult to find time, and expertise, to sample every note of their marimba. It could be useful to prepare several banks of samples for different brands of instruments. Such improvements would not only procure a distinct performance practice but would allow the aural relationship between the acoustic and electronic media to remain congruent.

Perhaps, the most important feature to ameliorate would be the pitch tracking method within the patch. The marimba, with its percussive attack, can fool the pitch tracker into hearing more than one note either originating from the reverb of the hall or the speakers. Perhaps a better mechanism for pitch recognition could be developed, one that could distinguish between the marimba and its reverberations. Despite the already powerful control the pitch tracker (fiddle~) contains, it could be useful to 'train' the patch to hear these idiosyncrasies of electro-acoustic performance. As luxurious and perhaps difficult this may seem it would decrease the number of times the performer would need to change the parameters (using the q-list) by pressing the foot pedal. This feature could develop a more musical method of control for electro-acoustic music and free the performer from any unnecessary anxiety.

One important concept I gained during this project is that a realization is not simply a means for signal processing and clever control methods. It is more a tool for a performer to create real music. This, to me, implies using the electronics in my musical interpretation; otherwise, electro-acoustic music could become vapid and tiresome. An audience is not aware when one is using a unique form of granular synthesis but rather hears the acoustic sum. If a performer is not able to relate and adapt to this environment than the whole effort is meaningless.

To preserve a means for performance practice it was apparent that a new version of *Daydreams* was needed and most importantly one that eliminated hardware dependency. (Risset 1999) Aside from miniaturizing the technology, it proved necessary to suit the musical needs of the performer. *Daydreams* creates an environment where the marimba is extended beyond its physical limitations but this can be lost if the computer realization does not allow for changes in this environment. This piece is very free for interpretation, yet the electro-acoustic conceptions are not as open. The computer is used to create a fantastical acoustic image. It seems only natural to preserve this environment by allowing for variability in the electro-acoustic realization.

I feel this is the most effective means for electro-acoustic music to exist with live performers. Indeed live electronic music essentially strives within this boundary and the further we extend our reach the greater the musical possibilities.

However, the continuing survival and proclivity of electro-acoustic music rests in the hands of performers as they are the sculptors of this art. Composers will always compose but a performer invents the musical summation and brings it to the appetent public. Perhaps the computer will eventually solve all these problems itself, but until that day, we relent to the human performer.

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