FINAL PROJECT REPORT

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Two Tape Pieces: "Vosive I" and "Vosive II"

WORKING PROCEDURE

My working procedure has involved a great deal of heuristic activity. The interaction between composer and computer in a real-time environment can become very close. This does not seem unusual when the musician's relationship with, for example, the piano (another machine) is considered. The possibility of implementing a compositional idea, listening to the result, and having the potential to alter the result in a short amount of time enables one to form a relationship with the computer of an almost symbiotic nature, especially when the potential exits for altering the original idea and/or results. Futhermore, particularly when using stochastic procedures, the computer's interpretation of a musical idea can, in turn, effect and influence the composer's original idea so the man/machine alliance can become an enriching experience for a composer.

Historically, this heuristic approach has been an important working method for composers- especially in times of stylistic or technological flux- and allows for a great deal of experimentation and development that cannot take place in an environment of less immediacy in terms of compositional work and sounding result. (The example of Haydn at Esterhazy is obvious. Would the classical orchestra-basically still in use today- have developed as quickly from the Baroque ensemble without this type of working environment?)

Since input/output procedures are quite straightforward in FORTRAN I have usually employed a real-time score-like commentary of running, sounding programs which give various information on such things as: present variable values, locations within sections of programs, choices made by the computer, etc. Also, composer input while programs are sounding is possible. This allows for futher in depth interaction and man/machine communication. (Especially of value in a stochastic environment.) (See figure which follows.)

Note: A more detailed explanation of the heuristic working method I have outlined here will be given in connection with the written illustration of a specific program.

OBSERVATIONS

One provocative idea that has arisen from my experiences is: just what are the limits and possibilities of machine choices (in terms of stochastic procedures)? In my experience, the constant composer interaction on all levels of composition seems not necessarily to negate the idea of random processes; but at least to alter what is meant by a random process involving the computer. If I repeatedly use the same seed value for random number generation and constantly shape and sculpt the sound output via the refinement of random choices until I am satisfied with a final, repeatable result that expresses my musical intent, then is there anything random about this result? This is meant as a rhetorical question, but it is thought provoking...

Cort Lippe
Composition Description
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ABSTRACT

This paper describes the approach and methodology used to produce two compositions, "VOSIVE I" and "VOSIVE II", at the Institute for Sonology.

INTRODUCTION

Since my arrival at the Institute over 2 years ago, I have been interested in the VOSIM sound production system developed by Kaegi with the assistance of Tempelaars and Scherpenisse. VOSIM is an economical approach to sound synthesis and has yielded some interesting results. Yet, my early attempts with VOSIM did not produce satisfactory results. Later, I realized that my difficulty lay not with the oscillators themselves; but, rather with the various existing programs written at the Institute to be use with the VOSIM oscillators. All of this software (designed for the general user) necessitates the description of 'instruments' which can be used to 'play' a user-created 'score' to produce sounding output. This approach is based on a clear division between instrument and score much in the manner of conventional instrumental music. (The main difference being that the composer creates instruments as well as a score.) Because instrument descriptions are static, this approach is tied more closely to instrumental music then MUSIC V which allows for a general instrument description which can change according to certain programmed conditions.

PROGRAMMING PARADIGM

An active branch of work in the computer music field advocated by various groups and individuals, including Andy Moorer, Curtis Abbott, and individuals working at the Institute, (which, interestingly enough, along with VOSIM is almost uniquely pursued at the Institute in a certain form) is the approach within a 'programming paradigm'. With this approach a programming language is used to describe musical structures, events and sounds. The separation into the catagories of instrument and score can be more blurred. A clear instrument definition is not necessary or necessarily desirable, and a separate score (having a clear parallel relation to instrumental music scores) is likewise neither necessary or necessarily desirable.

ACOUSTIC MODELS

Acoustic models may be valuable for inderstanding aspects of sound synthesis and the acoustics of convential instruments, but only in the same way that the study of common practice harmonic rules is valuable technical training for a composer: both are important background information which can serve to allow composers to break new musical ground. But the use of common practice harmonic rules or acoustic models may not necessarily produce either the most interesting music or sounds.

REAL-TIME

Within the programming paradigm, real-time sound production of musical structures with the computer has interesting implications: the execution, by the computer, of instructions produces sound. It does not produce a table or list of samples which are stored for later conversion into sound. This approach yields an interesting set of problems in terms of program run-time speed and its relationship to sound output and musical time; especially when output is via a DAC, but also in the case of hardware oscillator configuration usage.

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NON-STANDARD

One characteristic of the programming paradigm approach pursued at the Institute has been a general avoidance of acoustic models for sound production. Various models, including ones based on programming models found in the computer science field have been experimented with. This has given rise to the term 'non-standard' synthesis since most 'standard' computer music synthesis has historically relied on acoustic models. Any futher description of the 'non-standard programming paradigm' approach is unnecessary here. The work of Berg, Eliëns, Koenig, van Prooijen, and Rowe is amply documented here at the Institute.

PERSONAL WORK

My work with the VOSIM oscillators has been via the 'non-standard programming paradigm' approach. I chose to work in real-time and for that reason used the 6 COMPOSITE VOSIM oscillators (to allow for a maximum density of 6 voices). To produce sound each oscillator must be loaded with 7 18-bit words of information (42 total words for a 'chord' of 6 voices). Each of the 7 words is packed in a particular way with various data for an oscillator.(A total of 19 variables is packed into the 7 words.) Using FORTRAN there was ample time to produce values, organize them, and pack them for 6 oscillators. (Six voice 'chords' could easily be produced at a rate of speed high enough to produce sidebands.) Small MACRO-15 subroutines were necessary only to load, start, and stop the oscillators. The 7 18-bit words required for an oscillator to produce sound contained the combined instrument/score information produced via FORTRAN. The limitations inherent in a fixed (or static) instrument description and a separate score were easily avoidable since I controled musical structure from lowest to highest levels (sounds to overall formal elements).

Thus, I was able to control, at all times, just how much of an instrument description, score definition, and relationship and interaction between instrument and score I desired. The work took place within an interactive, heuristic environment in which stochastic procedures were employed in a constrained manner. An ongoing commentary via the terminal gave 'score' information in real-time on such things as: present variable values, locations within sections, computer-aided choices, etc. Eight possible timbral types or classes (ranging from general to specific in definition) were employed in two kinds of groups: similar or dissimilar. Larger structural aspects and the relationships between and amongst sections were decided in real-time via a combination of composer specification and computer control within the limits of a pre-defined general scheme. Density, frequency, duration, entry delay, amplitude, articulation, and timbral characteristics (envelope, amount of modulation and type, harmonic/inharmonic content, etc.) were also chosen in real-time by a combination of composer and computer via interactive compositional subroutines.

Since I feel it is important in my music to avoid the pitfalls of imitating instrumental music (in terms of basic parameters such as: pitch, duration, dynamics, etc.) and also important to avoid the limitations of acoustic models in producing music electronically (if electronic music can hope to have an exploratory function and individual identity separate from instrumental music) this approach allowed me to produce satisfactory results without being confined to a traditional instrumental approach.