MP1 REVISITED: AGA MATTER FOR PIANO AND TAPE

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Abstract

A brief description of Aga Matter, an example of a work conveying a world view, and of MPI the computer-assisted composition program used to produce it.

1. Premises

Contrary to a widely spread opinion among the general public, music can do more than just entertain. A composition together with the choice of tools needed to produce it conveys a world view either in an implicit way or explicitly. For example, any tonal piece describes a Newtonian, determinist universe where the power of reason is not challenged; a canzona firmus in a medieval or renaissance piece stands for the revealed word one cannot change but is allowed to comment on; the contrast between very long durations and quicker paced events in the School of Notre Dame compositions suggests the difference between the divine temporal scale and the human one and so does the Byzantine does while firmly anchoring and dominating the chant.

In traditional music, these are instances in which the implied world view is part of a general mentality. Nowadays, in the absence of a common musical practice, artists may deliberately choose the most appropriate tools for promoting a particular (i.e. their own) understanding of the world.

2. The Composition

Aga Matter is a piece for piano and computer generated tape and it was written with MPI, a computer-assisted composition program. The work is based on loose analogies with current ideas in physics: it describes a world of deep level symmetries which are not apparent but form a foundation for the entire piece. They are concealed by a large variety of seemingly chaotic events from the midst of which emerge now and then short recognizable gestures which suggest causal relationships.

There are five alternating types of music in Aga Matter forming a group structure; they are arbitrarily designated as R, D, K, A and I. In broad terms they can be described as follows: the R type is a fast, loud, aggressive kind of music including large chords and clusters; the I type, by contrasts is slow, soft and
delicate making a generous use of trills and tremolos of chords; the R type is the neutral element of the group, average in speed and loudness, matter of fact in character and with a greatly reduced pitch and rhythmic vocabulary. The D and A types situate somewhere in between R and R and D and 1. Like true life adversaries, R and 1 share certain features and elements allowing the circle to close.

Age Matter is divided into 21 sections, each corresponding to one of these five types of music. They range in length from a few beats to over 28 bars and there is a general trend from longer sections at the beginning of the piece to shorter ones toward the end.

Besides specific tempi, loudness and character, each of the five types has its own pitch and rhythmic symmetries as well as typical gestures or motives which recur during the piece. These symmetries are not obvious to the listener since they describe potentialities rather than being fully realized: an "imperfect" reflection of a simpler, more elegant and concise reality which is possible but not necessarily actual.

For example, the entire piece is a rhythmic ostinato, 20 iterations of a 29 beat pattern which itself is a palindrome. But the pattern only defines moments in time where attacks are permitted and does not guarantee that every such moment will indeed be assigned a sound. How many will become reality is a function both of texture or sound density at that instant in the piece and of what kind of durations are used (longer durations will tend to skip over some of the possible attack points, shorter ones will make use of more such points). Although all the repetitions of the pattern involve beat divisions by 4, 5, 6 and 7, each of the five types of music has also its particular flavor: quintuplets are dominant in R, triplets in 1, and sixteenths in D.

The pitch domain is structured in a similar way. Each of the five types has its own "scale," a palindrome whose axis of symmetry is in the middle register for R, in the extreme low range for 1 and extreme high for D. The scales result from the addition of elementary structures, "chords" of four or more distinctive pitches distributed over the entire range; they balance each other in pairs in order to create the desired symmetry or palindrome. All five scales have a number of pitches in common and each "chord" contributes to the make up of two or three scales. Here too, the R type has the most sparse pitch reservoir followed, in order, by 1 and R. A and D have the richest content since they are treated almost as the union of the surrounding types: I and R for A, R and D for D.

In groups or alone, some of the "chords" also produce identifiable gestures or motives which can exist only at specific moments of the ostinato since they contain unique arrangements of note values. Due to the fact that 39 repetitions of the rhythmic pattern and 21 sections of uneven length can not possibly coincide, there are only a few locations in the piece where a motive is possible. These locations then become privileged regions where rare and highly structured events may take place. While the ostinato, the "scales" and the palindromes are time reversible and symmetrical, the gestures/motives they generate have a definite direction in time: the being allows the emergence of the becoming.

Age Matter is written for five parts: piano two hands and three streams on tape. They are all organized in the same way with only one major exception: there are no motives in the tape parts. Other differences of detail and of character are: the density of the texture is constantly increasing on tape to the point of not allowing any rests while the piano follows the textures prescribed for each type of music; and the tape consists of mostly long, sustained sounds getting longer toward the end while the piano parts are very active and use much shorter durations - a metaphor for the dual nature of matter.
3. Tools

The ostinato, the palindrome and the pitch scales are produced by sieves [Tipei,1981] applied to larger, continuous collections of elements. The motives or textures are Markov chains controlling how such elements follow each other in melodic succession. Stochastic distributions and a set of random numbers which determine the choice of every detail mask the strict structures of the deeper levels, give the work an unpredictable outlook and make possible the existence of multiple variants of the same piece [Tipei, 1989b]. Stochastic distributions, sieves and Markov chains are the three main features of MPI1, a composition program in use since 1973 which was described in previous articles [Tipei,1987], [Tipei, 1989a] and papers [Tipei,1975], [Tipei,1981], [Tipei,1989b].

MPI1 is a comprehensive program in the sense that once the computations start, the composer can not intervene until the piece is finished and then either accepts or rejects the results. This way the composition is treated as a process which, once triggered, is capable of continuing on its own, like a natural phenomenon. While recognizing that this approach has little to do with practicality or efficiency, it should be also pointed out that it elevates the act of composing with computers to a higher or meta-level, it invests its integrity and uses the computer as a true collaborator in stead of a dumb slave [Tipei,1989a].

Although its basic structure has remained the same over the years (sounds treated as events in a n dimensional vector space [Tipei,1975]), MPI1 has been evolving continuously, a “frame-work in progress” to which new capabilities are added. One of such recent additions is the handling of chords which consist with one-note strings of events at the same part. In the past one way to create vertical aggregates was to have an arbitrary number of “voices” or parts contribute one sound each - similar to a contrapuntal texture where chords are the sum of simultaneous individual lines. Another way was to decide the size and/or the type of chord by declaring them to be one of the sound parameters or dimensions of the vector space; then write it by hand in a clear violation of MIP1’s general philosophy.

Now all possible chords are listed by their lowest (an arbitrary choice) sound, by type (the number of sounds it contains) and by the scale in which they can exist. The chord type is one of the sound parameters with values ranging in Agra Matter from 0 to 4: 0 = single sound, 1 = two sounds, 2 = three or four sounds, 3 = cluster made out of adjacent sounds in a pitch sieve (the equivalent of a diatonic cluster) and 4 = chromatic cluster. Each category contains a variable number of possibilities and one of them is selected according to pre-assigned probabilities. In other words, the chords are dealt with through weighted sieves [Tipei,1981].

The obvious disadvantage of this is that one has to list all the possibilities and their weights - a tedious procedure. Writing the sieve as a logical expression instead of enumerating all its elements is an alternative and so is the use of a number of shortcuts offered by the AUXIL program through which data is entered and “massaged”. The advantage of this approach is the total and detailed control over the vertical structures it offers: in Agra Matter the tape parts contain large chords spread sometimes over six or seven octaves while the piano parts utilize only arrangements of sounds which are idiomatic for the instrument and fall within the grip of a hand. In any case, the result is a very flexible writing for piano with frequent alternations of single sounds, clusters, chords and intervals.
Another recent addition concerns the possibility of introducing a motive or gesture at an exact moment in time. Usually, the transition from a stochastic process to the exact reproduction of a sequence of values as described by a Markov chain is gradual and difficult to control. Both involve a certain degree of randomness and the boundary between them is fuzzy at the best. Even if the switch can be activated at a precise instant, there is no guarantee that, for example, an already assigned duration will not be too long and end after the motive was supposed to start or that the Markov chain mechanism will not begin assigning values from the middle of the sequence (or motive) and not from its beginning.

A combination of carefully planned details and a newly introduced trigger insure though that the gesture will start at the exact desired place in the piece. The trigger consists of a sudden and very brief drop in the accuracy of the motive or pattern [Tipei,1975] to 0; other factors contributing to the creation of a necessary environment are are making sure that the durations assigned immediately before the motive are short enough not to go over the motive’s start time, coordinating all the sleeves at all parameters and fine tuning the density of the texture over small areas of the piece immediately preceding the motive.

4. Summary

MPI is a well suited tool for crafting a musical universe containing strong similarities to the real world as described by contemporary science. *Aga Matter,* for piano and tape was composed with MPI and took advantage of more software developed at the Computer Music Project: DIASS, a Digital Instrument for Additive Synthesis on Supercomputers and its ScoreN score writer [Kriese and Tipei,1992]. Inter.f, an interface between MPI and DIASS and GrafChords, an interface between MPI and Leland Smith’s SCORE: printing/editing software. GrafChords, ScoreN and Inter.f perform complex and difficult tasks: they not only map the parameter values offered by the computer-assisted composition program into much more detailed sets of data but they also interpret them.

References


Music Works 6  ICMC Proceedings 1994