The Morphe Concepts : trends in software for Acousmatic Music composition

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Abstract

Since the origins of the musique concrète, the search for a new musical expression has been associated with a research on new means of manipulating sound phenomena. For the last 20 years, the GRM has developed a number of computer applications, used by dozens of composers, including the SYTER system and more recently, GRM Tools, MIDI Formers, and the Acousmograph. Although these applications were developed in different contexts and by different people, they refer to a common approach to sound perception and to sound manipulation, and they share a number of concepts that have proved efficient in practical creative situations. The problem being what parameters to control and how to do it. This paper is a first attempt to analyze these common concepts. It will be based on examples realized with GRM Tools, with the MIDI Formers, and the Acousmograph.

With the first experiences of "musique concrète" in the fifties, new conceptual and technical needs appeared necessary for dealing with the particular situation proposed by sounds deprived of their original phonocenological context. During this first period were sketched intuitively the principal ideas and techniques that would orient the subsequent generations.

The principal axis of research consisted in developing more adapted technical and theoretical tools to permit further musical achievements and to understand the esthetical implications of this new sonic art in which instrumental performance was replaced by the coherent articulation of any listenable sound source.

Historically the first Morphi Concept was that of observation itself or, as Pierre Schaeffer called it, the "reduced listening" in which new observations were created (as those produced by listening to sounds independently from their original context) produce new listening phenomena, and the further situation in which sound becomes an object ("sound-object") and can be transformed into a musical-object by manipulation and integration into a new context, a purely musical context (Schaeffer, 1966).

A certain number of Morphi Concepts followed this first one: some of them, depending on the available techniques : cutting, sound-inverting, speed variations and loops; dealt with profound modifications of the time axis and the isolation of this parameter from its unidirectional flowing thermodynamical consequence. Filtering permitted spectral modification on sound-objects or the isolation of some kind of phenomena within complex sounds. Spatialisation introduced a new concept in which space and time-perception intimately react, and the three-dimensional presence of sounds gave space a unique and new musical value. New Morphi Concepts appeared later, musical experimentation and technical achievements enlarging the scope and directing new research projects.

Very soon, new tools were needed capable of manipulating sound parameters in a more precise and oriented direction : the "phonogène à ouïlette", the "phonogène chromatique" and the "morphophone" were mechanical devices that permitted continuous or step by step sound transposition as well as sound fragmentation and sound prolongation (a mechanical sampler in a certain way). These devices constructed in the fifties implied the possibility of having a synaesthetic and variable presentation of time as a parameter, in order to explore the morphological patterns of sound.

In 1972 the term "musique acousmatique" was reintroduced by François Bayle in order to describe the music made with electroacoustic or computer means and using tape or other kinds of magnetic and optical means as its final support. Acousmatic music may associate performing instruments but created from a Morphi Conceptual approach.

From an esthetical point of view acousmatic music concentrates on the poetical and spectral richness of sounds, and plays with this very
The arrival of digital technology opened a new age for Morpho Concepts, a more accurate control on sound parameters was possible, and new sound manipulations were imagined. The first software achievement began in 1975 with a package of non real-time programs (called the 123 programs). The primary aim of these programs was to simulate the analog studio facilities as well as the obsolete “phonogene” devices. Very quickly enormous new possibilities for sound transformation were developed and the basis for Morpho Concepts in the digital era were established.

Several Morpho Conceptual categories can be presented proposing a large variety of tools for sound exploration. These are general categories, complex manipulation may act on several categories simultaneously:

- time axis modifications: time-stretching, time-contracting, time-freezing, time-reversing
- spectral modifications: filtering, resonant filtering, harmonising, ring-modulating
- time-pitch modifications: time-delays, speed-variations, doppler effect
- density modifications: event accumulation, complex feed-backs, multiplication
- order of events modifications: sound fragmentation, sound shuffling, silence insertion
- spatial modifications: doppler effect, complex panning, spatial-position simulations, reverberations

Non real-time calculations permitted an extremely precise control on sound but distanced the user from the immediate sound experience which has always been a fundamental characteristic in acoustamic composition; therefore very soon a real-time protoc was developed under the name of SYTER. This real-time sound processor oriented towards sound transformation and sound synthesis, working on a PDP 11/23 system, permitted a very quick and ergonomic approach for sound manipulation on Morpho Conceptual basis. Almost all of the non real-time software were transferred to this system permitting an excellent interaction with the user.[Alouis,1984]

The next step was to adapt this software to personal hardware, and with a Sound Tools support, a new generation of software was developed under the name of GRM Tools. In this software old and new Morpho Conceptual algorithms were adapted to this largely diffused card. The software joins a powerful sound modification tool with a very ergonomic graphic interface in order to achieve quick control and modification on sound processes. Each algorithm of GRM Tools develops one of the conceptual categories described above permitting advanced sound transformations in a Macintosh environment.[Viniet, 1991]

The second package of Morpho Concept tools, came through MIDI systems and MAX software with the name of MIDI Formers (formerly called MacSwelltIs). MIDI code is more oriented towards instrumental action than to acoustamic work, so the general idea was to develop patches capable of generating large amounts of MIDI events when receiving a trigger command. These events are organised according to Morpho Conceptual behaviour models such as: bouncing, forsize-wheel, granulation, glissandi, repetitions and random control. These models represent the basic actions for which each patch is conceived, numerous and varied modifications permit a global control on all MIDI parameters intervening within the patch by means of a graphic interface with sliders, memories and switches modifying the flow of events to obtain very complex situations[De Lauber, Teruggi, 1991]

The third Morpho Concept tool is the Acousmographie that is a graphic tool for acoustamic score drawing based on a sonograph. This software creates very accurate sonograms and tabysgrams of any music thus obtaining a description of spectra and amplitude in function of time. With these two scientific descriptions of a music or a sound phenomenon, the user can place on the graphic frame any kind of symbol extracted form a very large library of graphical and tradional symbols and then adapt
these symbols (or die create new ones) to the sonogram in order to represent sound events as they are perceived and not only as sound spectral descriptions. The result is an "aural score" of a music, in which listening can be coupled to a graphic support that may contain a purely scientific description of the music, a traditional instrumental score or a morphological description of our musical perception. The Acoumogrâpher provides a useful tool for musical analysis and concert performance oriented towards non notable music. [Kochelin, Vinet, 1991]

These three developments: GRM Tools, MIDI Formers and the Acoumogrâpher, are the essential tools for the Morpho Concept, which represent the basis for acousmatic composition. Their existence has been confirmed by over 1400 musical works composed in the GRM studios since 1948. These works are a result of a close interaction between development teams and composers who have always proposed morphological concepts that were then implemented by analog or digital means.

In the last years a large acousmatic library called Acousmatique has been established to preserve, restore an permit research and diffusion of the music produced inside and outside the GRM as well as all the writings and scores concerning acousmatic music. An important CD collection permits a large spread of GRM music with 30 CD's issued already. The final link of the Morpho Concept chain is the Aucoummorium or loud-speakers orchestra composed of 70 loud-speakers of different forms and dimensions specialized for acousmatic music. This system permits music to live in its final communication space: the concert hall in which performed sound projection permits listening to be the perception of an intentional act related to a place, a performer and a public and not a simple sound diffusion situation.

Conclusion

The Morpho Concept are the principal trends of Acousmatic music. Their appearance 40 years ago has influenced the musical works and the esthetical approach of several generations of composers since. Their continuity through time is a proof of their conceptual value on which software development has been articulated since 1972. They have also permitted a close relationship between technical research and practical music application, offering a coherent ensemble of tools for composition, analysis and sound phenomena control. This paper is a first attempt to integrate in a coherent esthetical frame, the whole of the tools and concepts used in Acusmatic Music, essential for the morphodynamical approach to sound structures.

References