Book review

Eduardo Reck Miranda (ed.), *Música y nuevas tecnologías: perspectivas para el siglo XXI* (Music and new technologies: perspectives for the 21st century). Associació de Culture Contemporánia L'Angelot, Barcelona, 1999. 175 pp.

Even though the Spanish and Portuguese-speaking computer music community has experienced an exponential increase in number of active centres during the last ten years, the specialised publications in these languages are still rare. Most researchers choose to present their results in English in order to attain a larger public, thus precluding the growth of a body of Luso-Hispanic literature and distancing music students from up-to-date, first-hand information. Given this state of things, E. R. Miranda's initiative to collect a handful of articles on new music technology and to publish them as a book in Spanish should be highly praised.

'Music and new technologies' features a dozen articles by researchers in the computer and electroacoustic music (EM) field. Topics range from historical issues, such as Luigi Russolo's and Pierre Schaffer's work, to recent technological developments in evolutionary models of language and active listening devices. Some articles are Spanish translations of previously published material, but most pieces were specifically written for the book. The format of the articles is also varied, including literature reviews, speculative essays, and reports on new findings. The variety of areas and approaches presented in this book makes it a good contribution to the very scarce Spanish literature on electroacoustic music. But at the same time, this diversity precludes a straightforward, all-inclusive review. Therefore, I will cover briefly the content of all the articles and will only concentrate on a few controversial issues that deserve detailed discussion.

Various areas of research are addressed in 'Music and new technologies', such as Internet-based music and music distribution (essays by P. Blanchard, P. Nelson, F. Kon, F. Iazzetta and F. Pachet), computer-assisted (CAC) and algorithmic composition (works by M. Malt and B. Degazio), interactive music and musical interfaces (studies by P. Nelson, A. Mulder and F. Pachet). From a pedagogical perspective, Malt's detailed discussion of computer-assisted compositional methods and Mulder's literature review of musical interfaces are most effective. Nevertheless, Palombini's extensive bibliography on Schaffer's work and Miranda's original discussion about the origins of music should not be overlooked.

Blanchard, Pimenta, and Kon with Iazzetta discuss Internet-based musical practices. Philippe Blanchard hypothesises a future where musicians will work from distributed clients and studios will be established as servers to provide software for composers. Concerts will also move away from traditional venues to become Web-based broadcasts. Blanchard cites the example of one of his recent pieces. He collected 128 ten-second long musical clips from twenty-five different composers of various nationalities and combined them as an eighteen-minute piece.

Emanuel D. de M. Pimenta's article is structured as a string of freely associated ideas. Heavily influenced by M. McLuhan's and M. Eliade's thoughts, he suggests that musical discourses have been shaped first by the use of notation and afterwards by the introduction of the printed score. He proposes that Gutenberg's invention opens the way to a historical view of music that characterises modern times. From Pimenta's perspective, the next relevant technological invention is the telephone, which takes human communication to the realtime domain. The last step in this process is the introduction of realtime interactive communication systems that allow for immediate access to any piece of information in the world. Pimenta supports the view that this technology brings a qualitative change to musical thought throughout the world.

Fabio Kon and Fernando Iazzetta discuss the limitations of current musical work through Internet: bandwidth and time constraints, and lack of standardisation of user environments. As a possible solution for the bandwidth problem, they propose compressed data formats such as MPEG3 and alternate control formats such as MIDI, MOD and NetSound. Regarding the temporal constraints, they mention latency (delay in transmission from the server to the client) and fluctuation (variations in latency). The proposed solution is the use of new connection protocols, such as Internet 2. Kon and Iazzetta rightly point out the intrinsic limits of data transmission which for distant locations cannot be reduced to imperceptible delays. Kon's and Iazzetta's article was written around two years ago, thus it comes as no surprise that

some of its contents are already out of date. Today, MPEG3 has already become a de facto standard and realtime multichannel concerts have been transmitted through Internet 2 (see www-ccrma.stanford.edu).

François Pachet's article presents his work on active-listening music formats. In this context, active listening refers to a set of actions that the listener applies onto partially open musical material. These actions comprise mixing of a musical work and/or concatenation of various pieces. The section describing the elaboration of music catalogues seems to have a direct impact on current commercial issues: MP3 players and Internet-based music distribution systems bring to the foreground the need for intelligent information filters. Pachet uses constraint-satisfaction techniques to obtain catalogues of titles organised by similarity. The examples he provides seem to be specially relevant to commercial popular music. It remains to be seen whether these tools could be employed within less conservative musical environments.

Peter Nelson and Alex Mulder focus on interactive music and the development of human–machine interfaces. Nelson's view stresses the importance of touch as the mediator between the synthetic instrument and human gesture. He condemns the one-way control paradigm where the instrument does not give feedback to the performer and cannot adapt to changing musical behaviours. He suggests that work and effort should be an integral part of musical interfaces because these actions form the basis of real-world musical playing.

Mulder's literature review on Virtual Musical Instruments (VMI) encompasses three types of controllers: tactile, expanded spheres, and immersive. Under the tactile controllers section, he describes the aXiO system. Expanded sphere controllers include: Hands, Lighting, Radio Drum, Theremin, and Dimension Beam. Immersive controllers are: Biomuse, Glove Talk, Data Glove, and Miburi. Mulder's VMI implementation approach tries to take into account the physical characteristics of everyday objects. Nevertheless, Mulder believes that sonic parameter mapping does not have to be related to the objects' sound-producing mechanisms. The article concludes with a description of 3D control environments such as Choi's and the author's.

Eduardo Polonio attempts to find a definition of electroacoustic music. Not surprisingly, he concludes that a single definition cannot represent the breadth of creative practices found in this field. Thus, he finishes his article by saying that: 'electroacoustic music will be music, or it won't be'.

Carlos Palombini revises the history of *musique concrète* by studying the work of his founder, Pierre Schaffer. Palombini's article is structured as a discussion of Schaffer's work interspersed with historical references and philosophical quotes. With over seventy references, and Schaffer's and Henry's discographies, this article can serve as a most valuable resource for EM students.

Mikhail (and not Mikahil as it appears on the book) Malt presents a thorough study of computer-assisted compositional techniques. Malt divides the compositional work into a conceptual phase and a writing phase. Compositional concepts provide a prescriptive theory of musical language. In other words, the composer establishes a set of relationships among elements *a priori*. These relationships or processes are realised at the moment of writing the piece. Malt extends the meaning of writing to any form of compositional realisation: a digital mix, a graphic score, or a traditional score. The intermediate step between the conceptual and the writing phases is the implementation of models. The model acts as a mediator between concept and realisation. Very appropriately, Malt stresses the *act* of composing rather than the development of abstract ideas. The contribution of CAC to the compositional field is the ability to formalise – to implement as parametric models – the realisation of the musical work.

Both Degazio's and Miranda's texts deal with the use of genetic algorithms in musical research. Degazio describes his MIDI-based compositional system, Musical Organism Evolver. In this system, parameters generated by genetic algorithms are mapped onto MIDI values. The mapping process relies on Lerdahl & Jackendoff's melodic parsing concepts and Schenker's tonal prolongation structures to establish accentuation, rhythmic and melodic groupings. The program outputs strings of MIDI values representing well-formed melodies from a tonal perspective.

In contrast with Degazio's compositional use of biologically inspired software, Miranda applies evolutionary computing to investigate new forms of sonic and formal organisation. He reports his work on Chaosynth and CAMUS, two applications of cellular automata for sound synthesis and algorithmic composition. Recently, Miranda has been working with closed communities of agents. Each agent has a voice synthesizer, an artificial ear, and a memory mechanism. The synthesizer is able to produce vowel-like sounds by controlling three parameters: tongue position, mouth opening, and lips shape. Pairs of agents interact by producing and imitating sounds. Successful imitations are reinforced and poor imitations are discarded. With up to twenty agents and around twenty-five thousand interactions, Miranda has obtained sounds that match almost perfectly the formant structure of common vowel sounds such as /i/, /e/, /a/, etc.

Put into context, these intriguing results suggest a connection with current theories on the origins of language. Evolutionary psychologists have found that babies' babble, infants' first words, and words from ancient languages share a few basic sound patterns

across different cultures. Mouth physiology may constrain the available types of consonant–vowel combinations for first-time speakers. Thus, front-to-back consonant–vowel sequences are much more frequent than back-to-front ones. Similarly, the resonant structure of the mouth may facilitate the production of the vowels found by Miranda. In any case, his study is definitely worth further exploration.

As a whole, the articles dealing with Internet issues seem to be unrealistic regarding the day-to-day musical use of the Web. The impact of new technologies is intrinsically linked to the economic fruits provided by these technologies. And these fruits are usually not collected by everybody. Take as an example the current patenting by large pharmaceutical companies of genetic material taken from poor countries. The distribution of music through the Internet can only reflect the economical forces at play outside the realm of the Web.

Similarly, the popularisation of electroacoustic and computer music is usually motorised by forces extraneous to the EM community. As Polonio puts it, the terms electronic music and electronica have been cannibalised by DJs and pop performers. Whether we like it or not, digitally generated sound is the most pervasive musical material nowadays.

I am convinced 'Music and new technologies' will find a receptive audience in the Spanish and Latin American EM community, as well as in the broader artistic community. The review articles provide an excellent introduction to two important areas in the field: CAC and interactive music. The new contributions on active listening devices and evolutionary modelling will appeal both to EM researchers and practitioners.

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