Lost Time Accidents
A Journey towards self-evolving, generative music

The artist [is] an evolutionary guide, extrapolating new trajectories… a genetic sculptor, restructuring and hypersensitising the human body; an architect of internal body spaces; a primal surgeon, implanting dreams, transplanting desires; an evolutionary alchemist, triggering mutations, transforming the human landscape. Stelarc (1984).[1]

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December 1996

Abstract

Lost Time Accidents is a series of compositions exploring the creation of interactive real-time soundscapes and compositions for the MA project, *OMA: Ausländer und Staatenlose*. This article explores in brief the background to these compositions including the systems they are based on.

The ideas presented in this article are further explored in the paper, *Towards Generative Sound for Interactive Multimedia*.

This article was published in the first issue of *Some Such* - Journal of New Musique Australia, 1996.

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[1] Stelarc, ed. Paffrath, JD 1984, Strategies and Trajectories, *Obsolete Body / Suspensions*, (California: JP Publications, pg.76.

Origins

The world renowned minimalist composer, Brian Eno, predicts that children of the 21st Century will wonder why we listened to the same music over and over again. Eno, since his early days with tape loops, was creating systems "to make music with materials I specified, but in combinations and interactions that I hadn't."[2] Originally inspired by Steve Reich's 1960's tape pieces *Come Out* and *It's Gonna Rain*, Eno went on to establish principles of composition that are the cornerstone of ambient music as we know it today. Today, Eno creates what he has called, *Generative Music*, with the assistance of a piece of software called *Koan Pro*.

In 1995 a small UK based company, SSEYO, sent Eno a CD of music which was ambient in nature and, as they admit, was inspired by Eno's earlier work. Shortly afterwards, Eno contacted SSEYO and was soon creating music with the authoring system, Koan Pro. Mid-1996 Eno released on diskette *Generative Music 1*, a compilation of pieces composed with *Koan Pro*. His vision, to distribute systems for music that were never to be heard the same twice, had been realised.

Koan music had its origins in 1986 when SSEYO founders, Tim and Peter Cole, "wanted to create a computer music system which could affect you on an emotional level, by enhancing or filtering your perceptions, and provide ever-changing, eventually interactive, music."[3] In 1990 they developed the *SSEYO Koan Music Engine* (SKME) that enables the composition and harmonisation of music in real-time according to parameters set by the composer.

Koan Pro offers up to 150 (at the time of writing) "variable controls to influence and produce … music as it goes. The values of these controls, some of which are time sensitive, are written into a SSEYO Koan 'piece' ... They determine the notes and melodies generated when you play the 'piece' through the … SKME."

I discovered Koan late 1995. After receiving a copy of *Koan Pro* I rediscovered my ears. I'd been suffering from *repetitive listening syndrome*. Radio, television, traffic… our aural worlds are steeped in repetition.

I went on to develop additional processes to Koan that would create sound spaces: collage-like compositions that were to be generatively crafted in real-time by both computer and human alike. At the time, there was little use of Koan as an instrument in its own right.

Koan and the Web

SSEYO's mission was to "…to create ever-changing beautiful music (be it techno, drum 'n' bass, ambient) that can be integrated within a personal aural environment. The experiential and personal nature of music that the SKME generates is ideally suited to WWW sites, and 3D WWW virtual worlds and gaming."

For those with access to the Internet, Koan-based music can be heard with *Koan Web*[4], a small piece of software, or plugin, that is nested within a Web page. The plugin is invoked by an embedded Koan file which in turn calls up *General MIDI*[5] sounds from your soundcard. If you're using anything less than a General MIDI capable soundcard Koan files will sound terrible.

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[2] Eno, B 1996, *Generative Music*, Opal Ltd.
[3] Cole, T 1996, *Introduction to Koan Music and SSEYO*, [online] http://www.sseyo.com [Accessed December 1996].
[4] *Koan Web* has since been replaced by the *Koan Audio Player*.
[5] Set of sound patches agreed to by all major international manufacturers of MIDI equipment.

Koan Web comes with SKME. A Web site kitted out with Koan files will create new aural spaces every time it is visited. Koan files are generally smaller than MIDI files. An eight hour piece could conceivably take up less than 10k of valuable disk space.

I began by composing Koan pieces for one of my Web projects, *Ausländer und Staatenlose*. *Ausländer und Staatenlose* is a non-traditional opera exploring cultural dislocation. Most of the compositions are collage-like soundscapes, some of which are based on a system derived by anagrammatically relocating tonal clusters. I painstakingly attempted to replicate this system within Koan by importing segments of MIDI files from the title piece, *Ausländer*, into *Koan Pro*. Not an easy exercise. *Koan Pro* will not import whole MIDI files. You can move across fragments depending on note and bar ranges.

Eventually, I managed to replicate somewhat the harmonic values of *Ausländer*. Working within the limitations imposed by *General MIDI* I managed to create an atmospheric piece which Koan re-generates beautifully. The results were more exciting than I could have predicted. I completed three pieces and placed them onto my Web site. SSEYO described *Ausländer* as "dark Koan!"

Towards Interactive Composition

In April 1996 I spent a week or more in Sydney presenting a paper, *Generation: The Web as Generative Art* at the *1st Digital Aesthetics Symposium*. I returned to Melbourne, eager to listen to the pieces I had surrendered to Koan. It was as if each composition had journeyed far and wide and had returned, like close friends, to tell me tales of their adventures, mis-adventures and more. I sat in the studio with my sonic companions washing over my addled, Sydney-fied head-space.

I listened to them for at least an hour or more until I began to want to involve myself in the generative process. These pieces were shaping themselves into musical forms I would not have been able to realise. They were beautiful and engaging. I never tired from listening to them. There was always something fresh to discover in these pieces. I wanted to work with the SKME in real-time and perhaps involve other people as well. It was then that I started seeing the possibilities for generative music within installations, public spaces and even performance.

The concept of interactive composition is not a new one. Improvised music is perhaps the most popular and well known form of interactive composition, but is usually reliant on musicians processing and communicating musical ideas as fast as they possibly can. Computers can process much more information faster and over longer periods of time. If I could provide a computer with a cornerstone, it could perhaps construct an entire city whilst I populate it with new ideas. That city would continue to grow, to mutate and evolve in ways that I couldn't perceive. I was looking for an additive process in addition to the generative components of the SKME.

On February 2, 1994, the contemporary Austrian composer, Karlheinz Essl, performed *Lexikon-Sonate* as a live broadcast during the radio program *Kunstradio - Radiokunst*. Essl was exploring the performance aspects of "interactive real-time composition."[6] Whereas Koan pieces re-generate, or mutate within given parameters, Essl's *Lexikon-Sonate* never repeats itself, providing "…a challenge to invent a particular performance situation that utilizes … interactive facilities…"

Essl used a Bösendorfer SE Grand Piano and radio listeners as players. Listeners could interact with a computer program[7] by dialling a certain telephone number. "Whenever a call came through, *Lexikon-Sonate* would change its compositional behaviour by adding a new and randomly selected module into its combination chain. In this way the totality of radio listeners

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[6] Essle, K 1995, *Lexikon-Sonate* - An Interactive Realtime Composition for Computer-Controlled, II Brazilian Symposium on Computer Music, Canela.
[7] MAX, a graphical development environment for multimedia and music (IRCAM/Opcode).

would *govern* the form of the music, even though nobody could know the exact effect of their contribution."

If Koan changes the *compositional behaviour* of the piece and I and other participants contribute to the sounds it would work with then we could perhaps head towards the notion of an evolving interactive composition.

Though primitive in nature to Essl's work, I none-the-less managed to achieve a series of interactive compositions by coupling up Koan via MIDI[8] to various synthesisers and samplers. Each external component was fed by an individual pre-composed track within Koan. This in turn was changed in real-time by re-configuring pitch settings, semitone shifts, ambient duration changes and mutation factors, panning, velocity and numerous other parameters. Pre-sampled audio files were inserted into Koan tracks and sounds on all the outboard equipment were changed, modulated, tweaked and re-tweaked in real-time to taste. All this was done whilst retaining the integrity of the original composition but allowing for change as determined by Koan and the data it was processing over the 5-10 minutes of each composition.

After several hours of experiments in both the studio and live performance/installation situations we arrived at a body of work entitled *Lost Time Accident*. The result of a synergy between composer and machine, each composition evolved via an engaging process unique to human/computer interaction.

A selection of these compositions can be heard with RealAudio software on the Web site, http://www.toysatellite.org/secession/releases/sr001.php [Accessed July 2000]. The site documents the process as opposed to offering the process in real-time itself. Generative Koan pieces are available on Web sites linked to from SSEYO, http://www.sseyo.com [Accessed July 2000], and those listed in the footnotes of this article.

Future music?

Will Koan influence the music we will listen to into the next century? Will Eno's vision for a commonplace generative music be realized? Will children be asking us silly questions about our current listening habits?

My guess is that we will be listening to generative music more within public spaces than on radio. We'll hear it within games, CD-ROM titles and of course, on Web sites. Generative music can add to the creation of more holistic environments and experiences for people; whether it be a shopping centre, a public mall or restaurant. These environments always change. Why shouldn't the music?

All too often our urban environments contain artificially produced sounds of birds and water. It's a shame that we don't hear more birds, real birds that is, but why create a lie for our ears? Generative music, and in particular the *Lost Time Accident* compositions, aren't trying to replicate nature. They are comprised of the sounds and influences they were created in. Walk through and listen to most urban neighbourhoods and you will hear a rich diversity of language. Much like an ever changing piece of music, language is perhaps the most original form of generative music; it evolves, mutates, and interacts, *transforming the human landscape*.

The computer becomes more an instrument, perhaps even a collaborator with software the allows for random events to take place. I find most music software unintuative. It takes much longer to get an idea worked out on a computer that it does, say on tape... but that's also largely a result of having come from a tape background where one has a physical relationship with a studio and the tools one has to work with there. With a computer it's you, a screen and a mouse. It's not perfect

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[8] Musical Instrument Digital Interface.

by any means, but there is so much new territory to explore that it continues to remain engaging, enriching and tolerable.