Spiral Fiction

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Spiral Fiction **is a piece of interactive performance staged by the authors in 2002. The paper provides detailed information about the technology used, the nature of the interactivity employed, the artists use of the Bodycoder System© and the aesthetic and theoretical issues arising out of the work. The paper addresses the problematic nature of the audience gaze, the seductive qualities of new technology, creative balance in the presence of new technologies and the problem of placing interactive performance along side analogue and single art form disciplines. The paper also explores the psychophysical nature of the interactivity associated with the Bodycoder System and will discuss cross-modal perception and sensation. The authors draw on aspects of postmodern theory to further expand their observations.**

1. INTRODUCTION

Spiral Fiction was conceived as an hour-long multimedia digital performance installation featuring a variety of live and recorded acoustic events, texts, multiple video projection, telematics and 3D computer graphics. In *Spiral Fiction* much of the audio and visual landscapes are manipulated in real time via the Bodycoder System worn by one of the performers. *Spiral Fiction* was commissioned by Digital Summer and presented at the Green Room, Manchester, England in April 2002 as part of the cultural programme of the Commonwealth Games.

Since 1994 our project as collaborating artists has been to develop the means of drawing our respective practices, initially electroacoustic music composition and dance, into closer and more immediate proximity. This is an over-simplification of our initial aim, but it will suffice here. The Bodycoder System, an on-the-body sensor array, the first generation of which was developed in 1994, was conceived as a consequence of our search for a new platform, frame and quasi-methodology that might facilitate a greater creative and physical intimacy where the impact of electroacoustic compositional ideas, velocities, textures, emotions and protocols, could be felt, channelled and operated on the body, and this 'embodiment' used to inform and develop an organic, synergistic creative medium and performance aesthetic. Our development work with regard to both the Bodycoder System, creative collaborative processes and the aesthetics of our work to date, is well documented in performances and publications.[1]

2. THE BODYCODER SYSTEM – A BRIEF DESCRIPTION

The Bodycoder System is a sensor array designed to be worn on the body of a dancer/performer. It is a performance mechanism that enables the movements of a performer to generate, effect, manipulate and control all aspects of a multimedia performance including both audio and visual material. It is a kinetic interface that is powerful enough to offer the performer instantaneous control and compact and tough enough to withstand the rigours of human movement. As well as movement detection sensors (bend sensors most effectively used on the joints of the body), the Bodycoder System also includes a number of switches that provide the performer with the means of orchestrating and determining the composition of the work and in the most recent generation of the system, to access and move between MSP patches from inside the performance.

Because the performer requires maximum mobility, a radio system is employed to convey data generated by the sensors and switches to hardware and computer systems. The radio transmitter/receiver utilises licence-exempt 418 MHz circuitry. The transmitter and PWM coder (worn as a small belt pack) is designed to accept switch inputs and/or proportional resistive information from up to eight bend sensors. The coder/transmitter is used in conjunction with a custom eight-channel PPM receiver. In addition, a customised Peavey PC1600 MIDI controller is used to accept eight external control voltages from the radio decoder circuit that can then be routed to a variety of MIDI hardware/software options. The Bodycoder System uses small resistive bend sensors backed with spring steel; these are placed over the performer's joints. The bend sensors are accompanied by four to eight switch elements that are housed within a glove. The switches can be assigned a variety of functions from piece to piece and from software patch to patch or from preset

[1]See Bromwich (1995, 1998), Wilson and Bromwich (1999, 2000).

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to preset. Similarly, the expressivity/sensitivity and range of each of the bend sensors can be changed, pre-determinately or in real time, from patch to patch during the course of a piece. The implications of this will be discussed in greater detail later.

The Bodycoder System has now progressed from what might be described as a 'tool' with fixed possibilities, a static range and limited protocols (the 1994–1997 hybrids), to what could be described as a mediating system: the 1998/1999 system as exposed in works such as *Cyborg Dreaming* and *Lifting Bodies.* The current system is robust and flexible in terms of the manner in which it can be interfaced both at the physical and at the hardware/software ends, and in terms of the sophistication and flexibility of the functions and protocols employed.

The most recent programme of development work on the Bodycoder System has resulted in the expansion of the system's sensitivity and expressivity bringing it into a synergy with the natural physical expressivity of the human body. Complexity coupled with flexibility built into the system at the software end has opened the door to a range of subtleties and possibilities in terms of mediation, manipulation, generative aspects, processing and complexity of interactivity. This has been achieved chiefly through the possibilities offered by the MAX/MSP environment, with the skill base – the very particular performance modality that is akin to a synesthesic inter-modal perception – being acquired by the performer through practice.

3. *SPIRAL FICTION* – A BRIEF DESCRIPTION

The performance installation comprised three sets. Set one featured an eight-foot-square steel cage containing a variety of mirrors and three small video monitors (audio and video) running three structured and timed eighty-minute video compositions and three local loudspeakers. Set two featured a glass table on which both video – a sixty-minute video composition – and live 3D graphics were projected. Set three comprised a table on which was placed a 1930s typewriter; there was a bucket suspended above the table out of which a long bolt of paper descended to the typewriter. A contact microphone placed inside the typewriter was used for the live processing of the acoustic sound it produced. Four loudspeakers were positioned around the space across which both live and pre-recorded audio was mixed. An eighty-minute (including silences) electroacoustic soundtrack functioned as both an underscore for live audio events, a full-blown compositional feature and a timeline that provided the performers with a constant structure to work within. In addition, a video projector positioned front-of-house projected large-scale real-time 3D computer graphics (manipulated via the Bodycoder System) across the entire smoke-filled performance space. Lighting was tight and minimal. Two radio microphones were used to amplify and selectively process the speech of the two performers. In *Spiral Fiction* the Bodycoder was used to sample and affect the live voice of the actor and the voice of the Bodycoder performer herself, thus creating 'virtual' dialogues, subversions, fracturing meaning and generating pure electroacoustic landscapes. The bodycoder was also used to generate and manipulate the large 3D computer graphics that spun in and out of the main smoke-filled performance arena.

Figure 1. *Spiral Fiction* (April 2002).

4. PROTOCOLS AND FUNCTIONS

Eight live processing patches were written in MSP; after our development period only four were refined and used in the finished piece. Two granular synthesis patches, both with live sampling capabilities, together with a third that used live Vocoder principles, and a fourth modelled on ring modulation and delay. Each patch contained a variety of elements that could be accessed and controlled in real time by the choices and actions of the system performer.

Four finger-mounted switches provided the performer with the means of navigating the MSP environment and to select sensors. The first three finger switches were used to enable/disable individual sensors mounted on the elbows and knee joints and to initiate control of a number of variables such as:

- sample scrubbing,
- sample playback speed,
- sample pitch,
- random playback speed of sample grains,
- grain size,
- amplitude/ring modulation depth,
- amplitude/ring modulation speed,
- delay time,
- delay level,
- Vocoder bandwidth,
- low pass filter frequency, and
- low pass filter resonance.

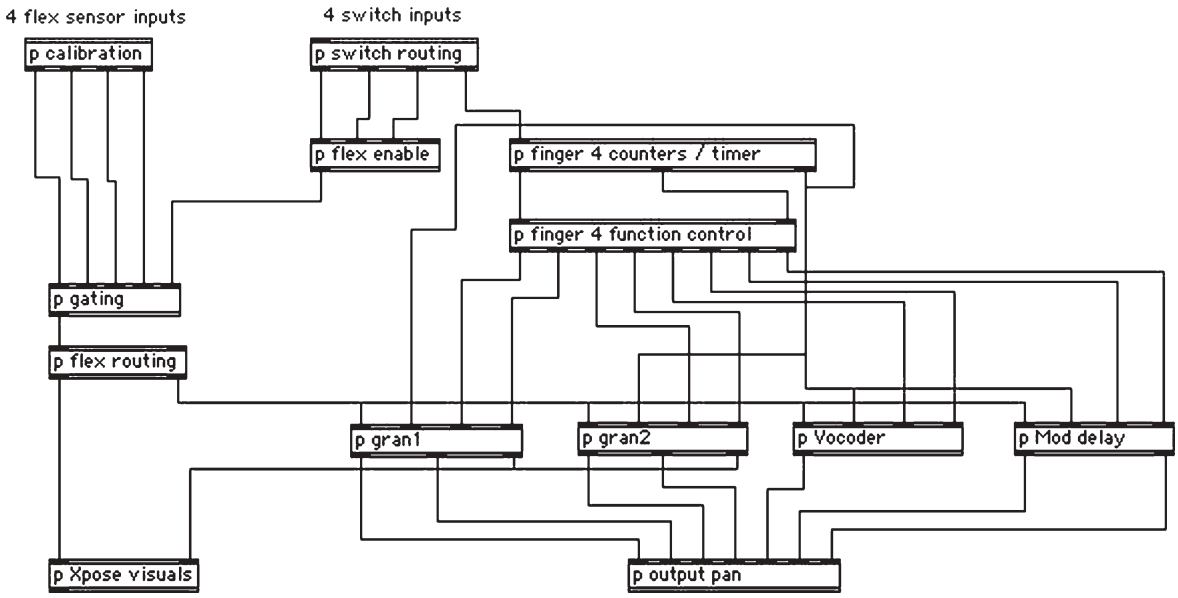

Figure 2. Anatomy of master MSP patch, *Spiral Fiction* (April 2002).

The fourth switch was used for all protocol switching and navigation. Functions assigned to this switch were:

- start and stop the piece/patch,
- select and enable audio processing patches,
- navigate through presets within each patch,
- initiate sampling of live vocal source, and
- determine which proportional sensor is controlling which variable within the patch.

Counters and timers were used to facilitate these control changes with preset protocols programmed for each of the four main processing patches. The performer had to learn a complex but versatile range of signal codes to give an unprecedented level of control from a deceptively simple control mechanism.

5. WHAT THE AUDIENCE SEES AND EXPERIENCES

The performance modality extending from the kinesonic (movement to sound correlation) and sonomotive (emotive embodiment of sound)[2] properties of the Bodycoder System requires a very distinctive focus and a particular and complex psychophysical engagement on the part of the performer. Here the 'arm is transformed into a modulation wheel . . . transcoding gesture and physical expression into sound . . . the performance occurs in the contortions of the dancer's body, but also in the modulations in sound as well as in the morphing images which dance to the body's tune across the video screen enclosing the performance space' (Hemment 1998). The experience of large-scale performances such as *Lifting Bodies* and *Bodycoder* that combined motion-picture-sized video/computer graphic projection and multi-channel sound diffusion have been described as like 'an acid trip with the performer pulling the strings with virtuoso control' (Ferguson 1997).

One of the problems with using any kind of video, but especially cinema-screen-size projection is that audiences tend to shift into a passive movie-viewing mode – all of their attention focused on the visuals with very little attention being paid to the performer. The audio component is often perceived, most probably unconsciously and as a consequence of the movie-viewing mode, as merely a soundtrack. Since registering the dramatic effects that large-screen projection has on the perception of audiences, we have tried to manipulate audience perception by scaling the size of both video projection and audio diffusion. We have used multiple video projection, fractured and moving images, moving screens, telematics and non-screen surfaces, such as smoke, in an attempt to thwart the passive movie-viewing syndrome and to promote a more open, less defined and more active perceptual audience state.

From the very beginning of our work with the Bodycoder System, we acknowledged the necessity to introduce our audiences to the specific language and semiotics of the type of performance we were presenting. Even at an early stage in the development of the system we did not want to 'demonstrate' the technology – we made a very clear choice to hide the computer systems from the audience and to costume the performer, thereby hiding the wiring and on-the-body sensors. Instead we structured our performance work in such a way that the audience were able to see

[2]Terms used by Drew Hemment to describe our work.

(through the first few minutes of each piece) the explicit mapping of audio and visual gestures to the movements of the performer. The ABC's of one-to-one control and reaction were spelt out before pieces developed in complexity and the level of interactivity shifted into modes that go beyond one-to-one mapping. We have found that, while this may not be an artistically satisfactory situation, it does nevertheless allow an audience an informed insight (albeit a very simplistic one) into the language and nature of the work. We have found this simple introduction goes a long way to alleviating some of the anxieties and 'baggage' that audiences bring to performances that involve new technology. By introducing audiences to the particular language of the Bodycoder System within the context of the performance itself, theory is exposed through practice. For us this is a very important aspect of what we do. By presenting insights into the 'workings' and language of the system within the context of performance, we are clearly signalling our commitment to the performance aesthetic above and beyond concerns for the demonstration of the science of electronics and programming. By providing an audience with a performance based 'way into' a work, audiences are, in our experience, less prone to developing anxieties concerning what and how things are working and are therefore more able to experience the whole performance. Given a certain level of understanding, audiences are more likely to allow themselves to be drawn into the performance – to commit to the sensorial journey with the performer – even when the performance develops in complexity and goes beyond what they understand, they are more likely to accept the 'unknown' thing they are experiencing. While the mechanism of the 'suspension of belief' that allows a traditional theatre audience to be 'transported' into the dramatic time and space of the performance is by now so familiar that it is part of the perceptual 'norm' of theatre, the unfamiliar language of digital and interactive performance often prevents audiences from entering into a similar relationship. Pre-show demonstrations of the technology result in the audience 'looking for' the technology which prevents them from fully engaging in the performance.

The performance language used and the virtuosity required to inhabit and facilitate, control and interact with the media the Bodycoder draws into its frame, is peculiar to the system. It is powerful and extremely seductive to watch. It draws both the sensual and the intellectual/critical gaze of an audience. In terms of traditional art form practice, artists are generally ahead of their audiences in terms of their understanding of the art form; however, when it comes to new technology this is not always the case. The proliferation of new technology means that it has become part of everybody's lives, from mobile phones to microwave ovens, Gameboys to in-car global positioning systems. Our experience of life with new technology is not always simple, positive or without disappointment and frustration. The current vogue for marketing hype often lets products down. Badly made products have to be returned to the store, while others are constructed from parts with a particular life span that go faulty just beyond the manufacturer's guarantee, seemingly designed merely to separate us from our cash. Nevertheless we are all caught up in the utilitarian dream – the desire for ease, economy and effortless productivity that new technology promises. These are the kinds of preconception that ordinary audiences bring to performances that involve new technology. From the point of view of the artists, the audience gaze in relation to technology is therefore generally very problematic. It is often characterised by either an informed (to a greater or lesser degree) understanding of the technology derived from agencies external to the work, or a sharp singular curiosity that tends to cut through or sidestep the poetics/semiotics of the performance. Such a gaze may also arise out of an innate mistrust of technology, an assumption that what is being proposed is somehow a lie or an illusion, an attitude left over from their experience of over-hyped products, and indeed disappointing so-called 'cutting edge' performances. This type of gaze seeks the mechanics and an immediate access to practical information about how the technology is mediating and generating events in the audio/visual field. The presence of this type of audience gaze tends to be a prominent feature of digital performance in general and interactive performance in particular. The 'given' aesthetics of theatre, grounded as they are in the conventions of illusion and technical trickery, further promblematise and frustrate the gaze of the new audiences that are drawn to digital performance. In spite of our desire and best efforts as performance practitioners to articulate new technology, the audience gaze for new technology suggests that it cannot be easily coupled, hidden or forced into an alliance with the conventions of theatre since it brings with it something phenomenological that stands outside of and in opposition to the historical and pre-existent conventions of theatre. The problematic gaze of the audience is a symptom and consequence of the presence of that phenomenological otherness that accompanies new technology. Perhaps it is the effect of seduction raised by the power of what Baudelaire described as the 'absolute commodity' the ultimate object that new technology has become. Our engagement with this new commodity makes the familiar objects of art seem plastic, ineffective, a sad alienated fetish. As artists, it is easy to play into the hands of this seduction without really comprehending the consequences or anticipating how easy it is to work in complicity with the problematic gaze of the audience.

6. DESIRE AND TECHNOLOGY

For the artist, new technology presents itself as a media/medium of seemingly endless possibilities, flexibilities, functions and applications. It is a tireless foil for our unceasing acts of creativity – a medium of endless enquiry that seems to expand in order to accommodate our desires, our visions and creative gestures. As such it is extremely seductive, and while work with new technology requires a massive input of time and energy, it is also extremely absorbing. As in any relationship with an extremely dominant, articulate, flexible character, it is easy to become subordinated and subservient. Artists fall prey to new technology, their subordination by technology relocating them as spectator to the pure means of accommodation, function and application. Under the influence of its heady seduction, performance values are often overshadowed and/or lost or frustrated by technological concerns. Observing performances that seem to showcase technology more effectively than they communicate as works of art is testimony to this fact. Such works demonstrate the loss of control associated with seduction. In order to counter the effects of seduction and objectify our working processes, perhaps it is necessary to ask ourselves who is the master of this process, the technological tool or the artist? And what are we trying to communicate to our audiences, artistry and aesthetics or techniques and programming skills?

7. TECHNOROMANTICISM

Perhaps the very idea of corporeal artistry is an archaic one in an age when communications systems so easily split us 'virtually' from our bodies, enabling the creation and projection of other coded forms of ourselves across a variety of media. The 'user of electronic media bypasses all former special restrictions and is present in many places simultaneously' (McLuhan and Zingrone 1995: 370) as both a disembodied and crucially an embodied intelligence. As an embodied intelligence we remain housed in flesh and blood, subject both to the body's strengths and weaknesses, its imaginations and its logic. Our relationship to the world is still founded on nerve endings and biochemistry. Though we may dream of abandoning ourselves to the powerful flow of pure data, the human at the centre of our digital performance interfaces, though dominated by the powerful and seductive presence of technology, is still the biological principle that animates the machine. Although within this relationship the human seems increasingly fragile, uncertain, fragmented, its complex self admittedly thrown off centre, it nevertheless shifts in like manner with the technological terrain upon and through which its imagination moves. This is a point of view that stands in opposition to the ideas of Virilio and other supporters of the notion of posthumanity, that perpetuate 'body loathing, a combination of mistrust and contempt for the cumbersome flesh that accounts for the drag coefficient in technological environments' (Dery 1996, p. 234). It could be argued that the devaluing and objectification of the body by society is prompting a desire to escape flesh and blood; equally this flight from the corporeal body could be symptomatic of humanity's drive to colonise and dominate other spaces. For Baudrillard it is strategy of simulacrum and disappearance inherent in the reversibility of the subject and the object. Our desiring, creative gestures, and will to traverse between the space that separates body from machine, biochemistry and data, always draw attention to the cultural landscape in which our desires take shape. Judith Butler suggests that desire is in part a desire for self-reflection; not so much a drive for innovation, departure, and the absolute other, but an unconscious drive to discern the nature of the self as the desiring object. The real project of desire is perhaps to 'see the condition of existence through the reflection of the life that has produced the reflective posture' (Butler 1999: 89).

The desire to create interactive meta-instruments represents an altogether different project. The proposition of the instrument is invariably modelled on pre-existing principles and aesthetic values. In the design of meta-instruments that extend but do not surpass our cultural understanding of what an instrument is and the skill base or practice patterns required to play them, we see the phantom of a self-seeking, the romantic, a technoromanticism (Coyne) for past values, seeking stasis not departure, assurances not radical innovation, as McLuhan suggests, 'our most impressive words and thoughts betraying us by referring to the previously existent' (McLuhan 1970: 16). This constitutes a nostalgic fetishisation of technology. Within this narrative, technology is located and used to reconstruct the semblance of the past in the present, a reflex that reveals an increasingly delusional vision of the nature of creativity and the dynamics of our present state of existence. It provides us with an alibi; a means of justifying the shallow and narrow uses we make of technology rather than using the possibilities of new technology to explore the 'reflective posture' of creative thinking.

8. TECHNOLOGY AS A MEDIUM FOR ENCOUNTERING BEING

Technology is a surface of complexity, depth and velocity; a dynamic system, a fluid architecture, a contingent environment complicit in the disclosure of our smallest and largest intimations; in which 'looking at something, understanding and conceiving it, choosing, access to it – all these ways of behaving are constitutive

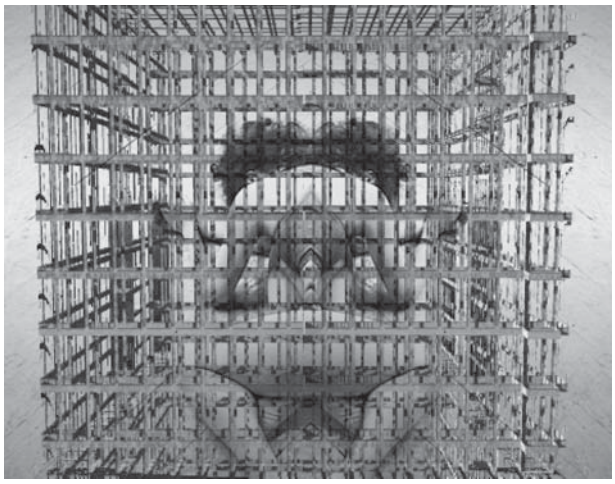

Figure 3. Still from *Spiral Fiction* (April 2002).

for our inquiry, and therefore are modes of Being for those particular entities which we, the inquirers, are ourselves' (Heidegger 1962: 26–7). In the fashioning of technologies, in exposing our thoughts, ideas and gestures within this landscape we become transparent; we see through and into our gestures and begin to recognise a mode of Being articulated through technology. This is what makes working with new technology interesting and of value to us as artists and enquirers after the nature of our own being. This is also why the documentation and analysis of our work and practices is important. The disclosures that analysis reveals not only tell us about the hard science of new technology but also about how we use it; it tells us about our creative choices, preferences, and modes of creative thinking.

9. STAGING A NEW AESTHETIC

In *Spiral Fiction* we made a number of intuitive choices concerning the staging of interaction within the multimedia environment. In retrospect we recognise that our choices were perhaps an unconscious attempt to restrict and subjugate, to thwart the dominance of the interactive medium in order to create equality across all the performance elements within the theatrical environment.

In *Spiral Fiction* the Bodycoder performer[3] was restricted to the inside of the metal cage. The second performer (an actor) was given free mobility and access to all other areas of the space. The piece was staged in a black box studio without seating, the audience was therefore free to roam among the set pieces, to view the action, objects, projections and television screens up close or at a distance. The actor moved among the audience, while the Bodycoder performer remained segregated, barred from such intimacy. The actor took the position of dominance within the performance space.

The interior of the cage was hung with a variety of concave, convex, Baroque and industrial mirrors, in the centre a 'tree of mirrors': a functionless piece of handmade *objet d'art*. As an audience member it was impossible to approach the cage without catching sight of oneself in the mirrors, without catching sight of oneself looking. This imposed an awareness of the act of looking, it repelled and objectified the viewer and drew attention to the complicity of the gaze in the life of the performance. Inside the cage were a number of small television screens on which pre-recorded distinctively analogue, old-style stop-motion animation was presented. Although it was not a conscious decision to pit analogue against digital, the presence of low-fi technology had the effect of eclipsing the interactivity of the Bodycoder System and relocating it within the arena and proximity of low-fi practices. Was this an attempt to veil the system in the illusionary guise of another more archaic practice? We're still trying to work that one out. Apart from the switches and glove, the rest of the Bodycoder sensor array – the belt pack, transmitter, sensors and wiring – were hidden beneath the costume of the performer; this is something that has been standard practice for us since 1995.

Apart from the sound of the Bodycoder performer's own voice, the audio/visual material manipulated by the performer was projected into the space beyond the cage. Generative audio and visuals were never seen (technically projected) or heard (amplified) from inside the cage, although the correlation between the performer's physicality and the sounds and images taking shape outside of the cage was apparent and the interactivity evident.

The sound diffusion system comprised a four-channel system in the main performance space across which the underscore, the amplified voice of the actor and real-time audio generated by the Bodycoder System were mixed and diffused. This was complemented by localised loudspeakers inside the cage that carried the low-fi audio tracks of the televisuals and the amplified acoustic voice of the performer inside the cage. The theme of segregation, made visible by the cage, also emphasised and drew attention to the motifs of disembodiment inherent in new technology. In *Spiral Fiction* the spatial projection of audio/visual gestures, originating from the body of the performer inside the cage and projected into the space beyond the cage, made the motif of disembodiment apparent.

In moments of strong interactivity the physicality of the Bodycoder performer was often limited in terms of space and consequently her mobility, and by tempering and limiting interactivity to certain periods within the performance. We also chose to limit the

[3]This terminology implies statutes, a politic and position that is not intended, but in this instance is an unavoidable consequence of language.

Figure 4. Still from *Spiral Fiction* (April 2002).

use of the sensor array, sometimes opting to make all sensors active and at other times limiting activity to the upper torso and switch hand.[4]

In *Spiral Fiction* we attempted to both limit the natural dominance of the visible interactive technology and deflect its seductive power through subversion. We weakened its presence in order that it could more easily be orchestrated with other non-interactive media. The tempered use of the Bodycoder System and the consequent change in performance dynamics made the creation of dramatic 'dialogues' across media and between performers (digital and corporeal) more viable.

10. INTERACTIVITY

During the development and rehearsal phase of *Spiral Fiction* the choreography and physicalities of the Bodycoder performer tended to be shaped by the sensation of the extra-dimensional significance – the audio and visual gestures – executed within the environment of the system. Expressivity was 'tuned', so to speak, by sensitising or de-sensiting the range of individual sensors. This can be done from moment to moment or from patch to patch, either in rehearsal or live during the course of a piece. Such changes have profound physical consequences; a de-sensitised knee sensor means that larger physical gestures are required in order to manipulate an audio element. This, for example, may mean that control 'feels' less precise because it is mapped to a larger physical axis. Working with the full 0–127 range of a sensor, for example, mapping this to scroll through the whole length of a large audio file, generates the immediate physical sensation of that area of the body being highly sensitised. This is mainly the result of the amount of audio activity the movement in that area produces and the level of focus and physical skill required to access and manipulate small parts of the file. Because these changes can be made to individual sensors, the quality of physical interactivity can vary from limb to limb and from moment to moment if required. Embodiment of the system and the extra dimensional or virtual audio/visual spaces that such interaction opens onto corresponds to a sensation of dissection, the autonomy of limbs, a fluid sensitivity.

Choices made in rehearsal with regard to the range and sensitivity of sensors hierarchically lead from or to aesthetic judgements about the physicality involved as well as the audio and or visual landscapes being accessed, generated and manipulated and the dramatic shape of the work. All choices are pluralistic as are the consequences. This preset sub-patch of the Granular One patch used in *Spiral Fiction* provides an insight

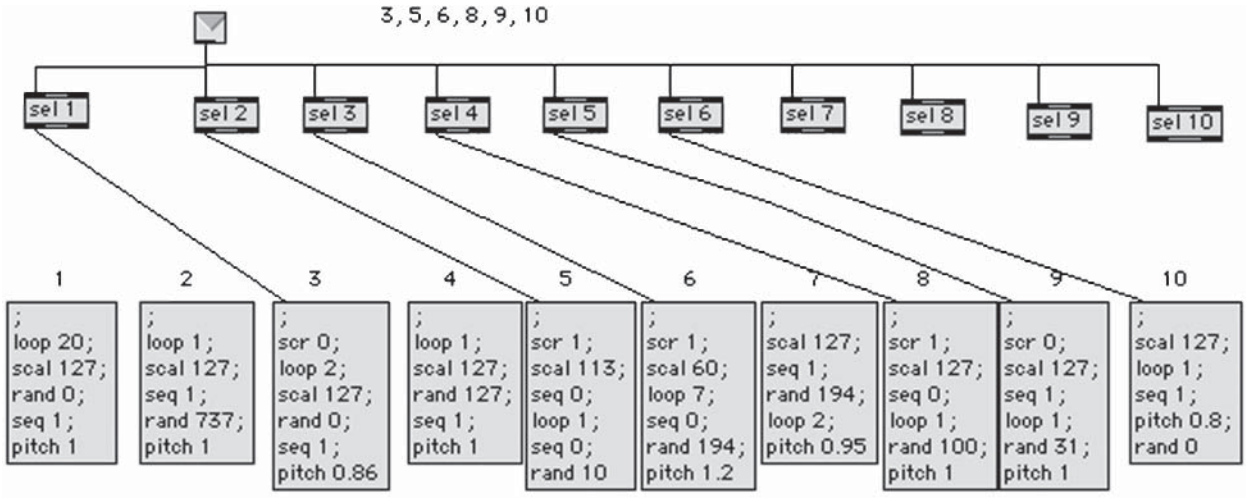

Figure 5. List presets in Granular One patch, *Spiral Fiction* (April 2002).

[4]For instance in the section of the performance that can be viewed on the accompanying CD-ROM.

into the interiority – the technical and consequently the sensual functioning of a part of the work. This sub-patch also provides evidence of the creative choices made in the rehearsal processes.

Here we have up to six variables associated with a counter/switch that can be accessed by the Bodycoder performer by selecting the appropriate message box number via the finger four switch. The arguments in each of the message boxes affect the interactivity of the right and left arm proportional sensors that can be enabled and disabled by the performer. In this instance the performer is acquiring live samples and then selecting 1–6 of the presets in order to manipulate the sample.

As can be seen, there are four message boxes that are not attached to the counter/switch. These are the ghosts of experimentations; the skeletal remains of creative processes, ideas physically explored and then discarded during the rehearsal process. This is part of the archeology of the work; the evidence of a historiography of processes that remains in the substrata of the patches. Closer analysis of the processes in message boxes one, two, four and seven compared to those used in the final piece might tell us something about the nature of the creative choices made. As well as suggesting choices made with regard to the audio composition, message box information also provides us with an insight into choices made with regard to qualities of interactivity.

Message boxes contain arguments with audio and physical consequences. The 'loop' variable dictates the grain size of the sample being processed with 1 being equal to 125 ms (small) and 7 being equal to 875 ms (larger). The item 'scal' relates to the scaling of the function. The proportional bend sensors always operate a 0–127 range, but this can be scaled to 0–60 as in message box six. This does not mean that the top end of the bend sensor becomes obsolete, but that a 'virtual' scaling of 0–60 is calculated across the whole 0–127 range of the sensor. In terms of the audio being manipulated by the performer, this corresponds to a change in physicality; bigger movements with, say the arm, are required to manipulate a smaller range of audio. Where the 'scal' function is 127, the full 0–127 range of the sensor is utilised. This means that small movements of the arm produce large audio effects. From the performer's perspective this feels like a sensitisation in the area of the sensor/body. Roughly speaking, the greater the scale the more sensitive the physical control and range and the more profound the affect and control quality of the audio sample. However, in *Spiral Fiction* this is complicated by 'rand', an element of randomisation built into some of the message boxes that is linked to 'loop', the loop position or starting point of each live sample acquired. This means that if the 'scal' function is 127, meaning that the performer has full-range and therefore intimate and sensitive control of a sample just acquired, a small amount of randomisation may mean that control is subtly subverted; that the sample is not looping from its original beginning and playing through to its end, but that the start point is randomly jumping along its length. This means that, in terms of hearing and control, the performer's attempt to anticipate, physically locate parts of the sample on the body, dictate the voicing of the sample in the space, and orchestrate the audio landscape, are being challenged by randomisation in the patch. What this produces is a level of interactivity that is extremely intense for the performer. This level of subtle randomisation profoundly affects the focus, concentration and physicality of the performer, and this changes the performance modality. As a result, the emotional/dramatic presence of the performer on stage is altered. This kind of argument 'tweaking' within each of the message boxes produces subtle (and sometimes not so subtle) differences in the quality of interaction and control and the psychophysical state of the performer. In terms of the impact of the control and manipulation of the audio sample in relation to other elements within the performance space, this is aesthetically calculated and notionally composed, tried and tested in rehearsal.

Because the performer is both acquiring samples live in performance and is free to select and move across the six preset elements within the patch, the performer has the ability to change her own performance modality, to articulate the intensity of her performance, and to respond to the dramatic qualities of a live audio sample by choosing to process it in a variety of different ways and across a variety of different physicalities from moment to moment within the performance in full knowledge that such choices affect her own performance modality. In terms of working with the acoustic voice of an actor, and creating a 'dialogue' based on the reflection of his words, vocal inflections and emotions which form in the vocal sounds, being able to respond emotionally and compositionally to the progress of this real-time dialogue is extremely important in this work. It means that emotional and dramatic interaction between the Bodycoder performer and the actor is dynamic and fluid.

The pitch function in the message boxes of the Granular One patch enables the performer to tune samples being introduced live into the audio landscape. This requires musicality and aural sensitivity. It also requires an ability to both anticipate the pitch of a sample before it is heard, finding its physical location, for example the angle of the arm, and changing from sub-patch to sub-patch while making compositional judgements about what is being sampled and how it is introduced. This is not simply a matter of choreography nor is it purely one of hearing, but it

requires the cultivation of a psychophysical, kinesthetic and sensual understanding of cross- or multimodal perception. It also requires the performer to work on two simultaneous levels: objectively navigating the technical landscape with a memory of functions and sub-patches, while working intuitively with aural and physical sensitivities, both operated within the parameter of strong aesthetic values founded in the creative and rehearsal processes. From the performer's point of view, interactivity very clearly takes place in and around the surface and interior of the body. In terms of the Bodycoder system, it is felt and experienced psychophysically.

11. CLOSING REMARKS

In *Fatal Strategies*, Baudrillard characterises our sense of being in the postmodern age as a passion for 'playing and being played' within the 'play of the world and seduction'. If technology is a meeting place of world and seduction, interactivity is perhaps the ultimate game play. It is a modality that exposes the nature of our being in play, interaction, exchange and correspondence. The type of cross-modal sensation and perception – something like an 'acid trip' – that interactive systems such as the Bodycoder can enable opens up a new domain of experience, a mode of being that is 'always open, never finally delimited, yet constantly traversed' (Foucault 1970: 322).

In September 2003 we will take up residency at the Banff Centre in Canada where we will begin work on a new performance piece using the next generation Bodycoder System which uses the Ethernet UDP network protocol instead of MIDI to communicate with MAX/MSP, offering greater accuracy. The system is also expanded from eight to sixteen channels giving the potential for more real-time access and navigation of the MSP environment and/or a greater range of physical mapping.

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