Virtual Performance
Performance effected in virtual space or by non-human performers

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Music and especially dance performance is inextricably linked to the concept of kinesis. Music and dance (some cultures use one word for both activities) have traditionally been activities that humans perform through movements of the physical body. The advent of computing technologies has enabled these traditional concepts to be extended, challenged and adapted to provide forms of expression and experience not previously possible. Virtual Reality technologies offer the ability to transcend the physical body in an increasingly more complete way and so challenge the Cartesian dualism on which so much of our cultures are based. This article explores some of the historical and conceptual frameworks of the small but rapidly increasing number of choreographers, composers and performers who currently working with these new technologies.

Throughout history, people have developed technologies to extend and transcend their natural bodies. Toothed wheels (cogs), when combined in various sizes, enabled controlled mechanical movements to be continuously repeated. Coinciding with the invention and development of mechanical and later electrical control of movement for measuring time (clocks) has been the invention of automata of various sorts, including those that mimic basic human and other animal behaviours. This led to the development of robots, the most sophisticated of which are now equipped with sensors and effectors, can build their own representations of the world (using neural networks for example) and can perform quasi-autonomous patterns of action in response to conditions in their environments.

Machines that mimic the actions of some living body remind us, by reflecting and refracting our actions, of the mechanical nature of ourselves. We often anthropomorphise them by referring to them as "he" or "she" and give them human names and think of them as friendly or otherwise. As these machines become even more complex, they challenge our beliefs in a vital life-force and in the necessity for such a life-force to be present for expressive performance.

When it became technically possible, recordings of the sounds of musical performances quickly became popular; the public seemed to experience little difficulty in being "transported" by means of these recordings into the concert (or beer) hall. Unseen performers were easily imagined and it was a small step to experiencing music made by virtual performing machines (software controlled synthesisers) as a musically valid form of expression as long as the resulting sonic gestures could be imagined as being physically performed by humans. In a similar way, electrically created acoustic spaces (using reverberators) can believably replace recordings of sounds in real physical spaces.

In as much as dance relies on the interaction of bodies in and with physical space (and so is intrinsically less easily abstractable than music), virtual dance, beginning with automata and robots, has had to wait until the technology was powerful enough to portray bodily movements purely visually. In allowing the user to adopt an animated persona, Action Computer Games are a basic form of virtual performance. These puppets offer the possibility of dizzying but precise mechanical actions and other forms of character realisation. Their sets of

Virtual Reality and cyberspace

The explorations mentioned so far can be thought of as "augmenting" reality and have been followed very recently by a technical, philosophical and artistic exploration, known as Virtual Reality (VR). At it's simplest, VR is a reality that appears to the senses to be real but which really isn't. It is a combination of biology and technology so melded that the division between the two is difficult to discern because the technology presents sensory information and feedback to the user through instruments such as head-mounted display units and body suits, with the intention of producing a convincing illusion that the user is immersed in an artificial world–a technosphere known as cyberspace. The terms 'VR' and 'cyberspace' are sometimes used interchangeably. 'VR' is also used to describe the tools used to produce that reality and 'cyberspace' is also frequently used as a synonym for the World Wide Web generally. VR/cyberspace is a computational space that is embedded in the human-computer interface, but it is also a mind-space, in the way that mathematics, music and myth are also mind-spaces.

A detailed discussion of VR and its full implications for music and dance performance is beyond the scope of this article because VR is effecting a fundamental shift in the aesthetics and philosophy of the late twentieth century. The realm of "the virtual" offers the possibility of a distinctive move beyond the modern era. Following the work of Henri Bergson, who showed that a memory is not an actual image formed after the object is perceived but a virtual image that coexists with the actual perception of the object, Gilles Deleuze more fully enunciated the ontology of the virtual as a philosophy of difference without negation that surpasses the logic of the possible; a logic of multiplicities, of invention, not identity, which produces techniques, effects and solutions instead of premises, arguments and conclusions.

VR instantiates the collapse of the boundaries between reality and its representation, between body and mind, biology and machine, natural and artificial, organic and inorganic, material and immaterial, human intelligence and artificial intelligence, exterior and interior, in fact all the foundations of Cartesian epistemology. In doing so, it allows for a radical shift in consciousness by enabling a transcendence of the limitations of the human body, of chronometric time and metric space, of traditional metaphors of self and identity that imprison the mind in solipsistic systems.

The Body

The potential of VR is that it can free us from the constraints of time and space and many of the forces on us that have shaped our evolution. These forces include gravity, gender and death. It is thus a tool that appeals to our longing for transcendence. By reacting to any moves the body might make to counteract what it is experiencing, VR is a radical addition to the artist's tools of illusion because it inhibits the participant's ability to 'frame' or contexturalise the illusion at will in the way can be done by turning away when viewing a cinema screen, for example. Instead, the illusion continues and deepens as it is tested; it is no longer out there or over there, it is here and one is present in it like the prisoners in Plato's Cave.[1]

Cyberspace does not exist independently, however, as by itself, modelled cyberspatial information is latent; it has neither sense noressence. In VR, there is a human-machine symbiosis in which the body is the signifying surface by which the machine has access to reality. Whilst Cartesian dualism emphasises the separateness of mind and body, ecological psychology and recent developments in the field of machine learning have emphasised the essential symbiotic relationship between the perceiver and the environment for the development of intelligence. Weightlessness, for example, produces a lack of orientation and a reduction in awareness of movement, direction and extent, and human vision relates to whether we fall on the ground or not (movement is nothing but a fostered lack of balance) and the tensile integrity of the multi-articulated musculo-skeletal system has evolved to adjust to pressures such as gravity, acceleration and momentum.

To experience being human, one must grow and develop with the body and the perceptual system of a human in an environment which affords this process. Some researchers are even suggesting that humans are not very intelligent at all because if taken out of our culture and familiar environment we have difficulty functioning. Constructing and performing in cyberspatial environments which require different modus operandi to the physical

world, thus challenges and extends the very nature of what it is to be human.

Performance

To perform any action (lit. to carry into form) requires that that action to be observed, either by the being or thing performing the action, or by others. By developing movement awareness through the process of abstracting inner sensations, whether kinaesthetic or not, dancers and musicians can use the body (and its instrumental extensions) to materialise physical and sonic forms.

In VR then, there is a role for the human performer to be both a data collection device and a human narrator of cyberspatial movement. By extending the computer into the body, the performer opens themselves to the experience of new emotions and grants the computer an emotion that transcends time. Just as computer software and hardware have made it possible for enthusiastic amateurs to express themselves in sound and visual media without the need for extensive repetitive training, so the immersive nature of interactive cyberspatial environments will enable the non-specialist to experience the expressive potential of physical movement. This does not render the specialists redundant however. By using their technical mastery to explore technology which has varying degrees of autonomy, their role changes from being the vehicles through which an audience passively experience their humanity to explorers who extend the qualitative territory and expressive reach of performance, and thus experience.

A major shift in emphasis for performance results from this exploratory process, which is more akin to game play than to narrative. As sequences of cause and effect in time and space, narratives are finished, essentially retrospective things and are thus more historic in nature. On the other hand, games offer beginnings and possibilities and are structured in terms of specific patterns of play. Games encourage participant immersion. In games, experience in the present is all-important, and whilst narrative in games may determine goals, they do not necessarily structure the *experience* of the game.

Any mechanism that offers such fundamental experiences will radically affect the whole nature of performance, of what it means to perform, to observe a performance and to interact in performance. By thus being open to the possibilities of new expressive languages, they help define new boundaries for what it is to be human.

The opportunity for artists to work in relatively complete virtual environments such as the CAVE or the WEDGE is still quite rare in Australia and is restricted to those who have access and technical literacy in the computational arts. Australia does however have a number of artists who have extended the nature of performance in some of the ways outlined in this article. Work in the 1970's

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[1] Plato. The Republic, Lee, H.D.P. (trans.) Harmondsworth. Penguin Books Ltd, 2nd Ed, 1974. Book VII, pp 316-325.

by the dancer Phillipa Cullen, in collaboration with composer Greg Scheimer and others, created music directly from body movements on specially constructed pressure-sensitive floors. Later Stellarc began using a prosthetic third arm and autonomous robotic choreography. Many composers, choreographers and computer artists, have begun extending the experience of performance though the use of sensing technologies. The works of Garth Paine, Helen Sky and the visual artist John McCormack are particularly mature examples. My own work, with others such as the animator Stuart Ramsden and composer Kimmo Vennonen, in the use of interactive polymedia systems for procedural compositions in specially constructed immersive spatial environments such as the geodesic dome performance space, predated VR technologies and remains focused on providing public immersive experiences without the need for headsets or bodysuits.

As digital technologies increasingly become embedded in our culture, more and more artists will feel the need to learn to work with and through them. This article has attempted to give an historical and conceptual framework for some new and primarily emerging means of expression. It cannot hope to survey the breadth and depth of a field (and all those working in it) that is on the precipice of the future. Using one of the many search engines on the World Wide Web pointing to Australian sites, with keywords such as "immersive", "performance", "virtual", "interactive" appended to "music", "dance", "composition" or "choreography" will provide a more complete and up-to-date summary of current trends.