Conceiving embodiment:
the dance-architecture of Spawn

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1   Introduction

Fundamental shifts in concepts of liveness are taking place in theatre architecture as it incorporates 21st century digital technologies. The development of new ecologies of performance through the convergence of live presence and digital technologies are central to the development of dance as it is challenged by the proliferation of new media. Spawn is an inter-disciplinary research project involving the practice of dance, architecture and computer science. Spawn aims to conceive an embodied space by investigating presence and being in environments that merge physical and virtual dimensions, Mixed Realities. Questioning the limits of the body and its virtual representation, Spawn fuses the thinking of embodiment and space with the design of creative technologies for the interfacing and performance of digital environments.

2   Project description

Spawn takes place on an interactive stage informed by a camera-based interface. The camera tracking system identifies the shifting outlines of the dancers' bodies which in turn becomes input for a *virtual other*, a digital morphology shaped by the presence and movement of the performers. The virtual other is a complex geometry comprising four circles stretching a spline-based membrane between them. As the performers move they affect the virtual other deforming and reforming, contracting and expanding, folding and unfolding its digital skin. The visualisation of this kinetically modelled virtual other is projected back into the physical space of the performance in real time, generating new forms of interaction and creating a blended environment of real and virtual spaces for a mobile audience.

3   Research challenges

Research for Spawn explores the relearning of embodiment to accommodate the expanded materiality of a performance environment which provides a platform for the entwining of real and virtual forms. In Spawn the digital is conceived as a separate dimension, informed by the embodied presence of the performer while retaining an independent morphology and motility. Unlike other computer interfaces for dance performance, such as Hypervision MoCap, the Spawn interface does not seek to identify the user's body parts and map them onto a corresponding digital anatomy. Instead, a set of statistical characteristics of the silhouettes size and shape are generated and updated in real-time[i]. This open relationship between physical and digital presence proposes the overlapping perspectives of two distinct spatial narratives and their surface tensions. Choreographically, working with this concept of virtuality ruptures classical understandings of

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space and time creating fresh challenges. How is performance presence challenged by the incorporation of an ephemeral morphology which both envelopes the dancer's silhouette and invites extension into a digital spatial matrix of its own? Architecturally, the aim is to design a space which incorporates physical as well as digital dimensions while engaging the temporality of interaction and performance. Given this, what are the spatial conventions that need to be reformulated for an interactive stage where the digital spectacle merges with the performed event-space of the dance-architecture?

Collaboratively we have discovered a series of devices which cross between disciplines and are practical tools for addressing and solving these research questions. Firstly, it has been important to move beyond paradigms of practice in performance and architecture that suggest stable relationships between the body and the built environment. The embodiment of an event-space in Spawn, enables a shift in practice towards a state of flux between the real and the virtual, the contained and the containing. To achieve this we have devised an improvisational score which enables a series of contingent and oscillating relationships between the dancers and the virtual other. Secondly, the dancers have learnt how the detachment of their gestures can invoke an extended presence communicated to the audience through kinaesthetic perceptions. This extended presence shifts the centre of gravity within performance beyond the primacy of the performer within the staged event. This effect is further amplified by the third device, the mobilising of the audience which enables them to shift their points of view throughout the duration of the event. Finally, in response to audience feedback, a cultural framing of the performance event has been designed. Spawn as a space-in-flux, is staged as a *Changing Room* thus siting the digital within a domestic interior. Here, the digital becomes an inherently meaningful context; the intimate space of a boudoir. The perfomer sits at her vanity table or changes her clothes in front of a mirror which becomes a screen for the projections of the virtual other. Through the mutable qualities of this furniture the status of the everyday is extended, altered and augmented. Known cultural objects become transformative moments, enabling the transgression of presence into the extended environment of the digital. To conclude, through a digital scenographic invention – an interactive stage - Spawn challenges the duality of figure/ground relations and the agency of the performer through a set of metamorphosing relations. Through these intimate interactions they transform, not only how the system perceives their presence, but also how an audience understands the habitation and significance of a mixed reality environment.

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[i] The Spawn interface was developed in collaboration with B. Buxton, J. Mortensen C. Parker and S. Hu, University College London. It analyses the statistical characteristics of the silhouette's size and shape using active shape models developed by Cootes and Taylor [Cootes and Taylor 1995].
Cootes, T.F., Cooper, D., Taylor, C.J., Graham J. 1995. Active Shape Models - Their Training and Application. In *Computer Vision and Image Understanding*, Vol 61 (1), p. 38-59.