Immersive Simulation, Design, and Visualization

Motion Capture within Space+Dance+Digital

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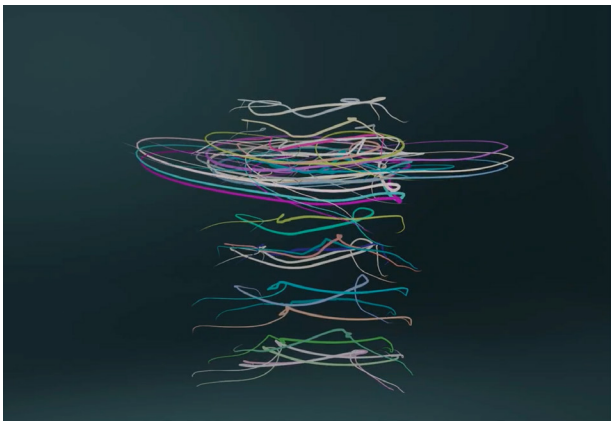
Space+Dance+Digital (S+D2) is an immersive augmented reality (AR) dance-research platform utilizing motion capture technology in MIT.nano Immersion Lab. At the core of the project is a novel use of motion capture that uses the captured dataset to manipulate an aesthetic immersive four-dimensional (4D) space, accessed via AR.

Position data from a minimal set of specific anatomical markers is used to capture spatial-temporal movement trajectories and relational patterns intentionally generated across the dancer's moving body. During motion capture, the dancer performs choreographed sequences to manipulate how the individual tracking markers interact and combine in the resulting dataset.

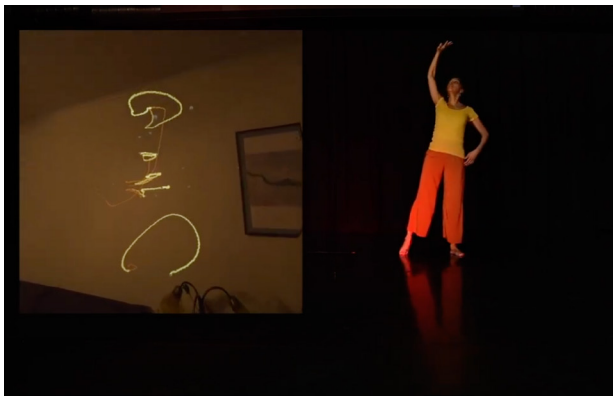
The data, visualized as trails of color, is overlaid and move through the digital space around the AR user, slowing dance's ephemerality into a lingering archive of path-ways and color. The AR user can move into the assemblage of trails, effectively moving with and within the unseen form of the dancer.

The AR user can generate temporary motion trails using hand tracking, enabling real-time responses to the choreography. This interaction invites users to co-create the spatiality around them through an embodied dialogue with the digital environment. A networked, two-user application allows participants in different geographic locations to enter the AR choreography simultaneously. Each can see the other's hand trails in re-al-time. By engaging with the spatial logic created by the choreography, users can dance together, co-creating a spatial experience despite their separate physical circumstances. S+D2 is being further developed for occupational therapy and somatic-reconnection-focused applications in hospitals and prisons.

S+D2 approach utilizes motion capture as a tool for spatial-temporal co-creation, addressing the moving body as an assembled environment that seamlessly extends into larger assemblages. The project demonstrates how motion capture, when imagined as generative rather than representative, can support immersive, embodied intra-action. We continue to address our primary research questions: What does it mean for dance to take advantage of the physical boundary crossing of digital space? Can dance+digital contribute to new ways of artistic and political togetherness?



▲Figure 1: Motion capture data rendered as 2D spatial trajectories. Each line represents path of specific anatomical marker over time, abstracting dancer's form and preserving dynamic qualities of movement.



▲Figure 2: View from within AR experience, showing choreographic motion trails overlaid on user's physical environment. User's hand-tracked responses generate additional trails, enabling real-time interaction and spatial co-creation across locations.

FURTHER READING

- K. Barad, "Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning," Durham, NC: Duke Univ. Press, 2007.
- T. Ingold, "The Perception of the Environment: Essays on Livelihood, Dwelling and Skill," London: Routledge, 2000.