THE SKIN OF OUR SHEATH

a performance on physical creativity in an indeducible virtual world

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As we find ourselves in the covid era more and more isolated from physical presence, and further retreated into digital realities like social media and Zoom, we find ourselves needing the ability to swiftly cross over from virtual realities to physical realities and back, comprehending the metaphors, gestures, and idioms in each. When we observe people in VR performing some task intently, we imagine a virtual world in our own mind that often conflicts with what they are actually experiencing. We make stories based on what we think their reality is. Inversely, we present a performance outwardly observable as a dance to the audience, who lacks knowledge of what world the performer is involved in. The outward performance is actually a physically creative task of garment construction for a member of the audience, which subverts audience expectations of what the performer's reality should be. We present a performance *outside* VR that deliberately mismatch audience and performer perspectives. Understanding and playing with perceptions inside and outside virtual realities will be necessary in our increasingly physically isolated world.

**CCS CONCEPTS • **applied computing ~ performing arts

Additional Keywords and Phrases: embodied gestures, experimental garment construction, virtual reality, dance performance.

1 INTRODUCTION

We often see people playing in Virtual Reality (VR) and tell ourselves, "what a great time they're having!" They are unaware of the real world, shielded from what this world is like for that moment in time. What people do in VR has its own internal consistency that makes sense for the environment they are in, but which we the outside observer is blind to, but rather scratch our head trying to figure out what they are up to. We create stories based on the idea that someone has her own story in her own world.

To play with perception of audiences observing players in their own worlds, we perform a dance in VR that subverts what audience expectations are, showing them at its conclusion a creation that debunks what a performance ought to do, but rather an unexpected product of the physical creative process.

2 BACKGROUND

Considerations of alternative realities in performance have included generally two areas: 1. using VR technologies to facilitate or enhance performance-based interactions, and 2. using the performance medium to

question our understanding of what constitute realities [2]. In the former camp are projects for dance training, including one that use VR and computer vision to help capture and visualize ballet dance training [8] and a system applying motion capture data in a gamefied VR environment for teaching salsa dance [11]. Along these lines are applications that help particular vulnerable groups overcome their physical issues by movement interactions in VR, applying for example to those with urological mixed incontinence [9].

Also contributing to facilitation of performance are a genre of projects that produce performance *within* VR. These works take VR as a medium which expands immersiveness beyond that of live performance, taking theatrical form as merely a simpler simulation environment [4]. These types of works include *Stuck in the Middle*, *Giselle VR*, and *Whist*, all of which takes place within the VR environment as a way to allow a 360 immersive experience as well as a degree of audience interactivity [12]. Works along these line also include using 360 video for live-streaming performances in the VR headset [7] and extending beyond performance to mixed reality collaborative dance environments [13]. The effectiveness of these procedures have also be investigated biometrically using psychophysical measurements like EEG [6].

In the second camp are performances that attempt to question the nature of reality from a VR perspective. Early works here include *Osmose* and *Machinal*, which use external instruments like datasuits and projected environments to narrate an out-of-body experience [3]. One key work in this era was *Dancing with Virtual Dervish: Virtual Bodies*, an exploration of the virtual human body, which led its creator Yacov Sharir to conceptualize performance in VR as a new way of designing space as opposed to only gestures [5]. *Farewell to Dawn* was a mixed reality dance performance in which an Augmented Reality (AR) representation of the dance stage is combined with the VR view of the performer to produce an integrated environment perceivable by both the audience and performer [1].

3 METHODOLOGY

What these previous applications have in common are 1. the need to unite audience and performer perspectives, and 2. productions that take place inside the VR environment itself. Our work subverts both of these previous perspectives by considering a production that takes place *outside* VR using embodied gestures that have different meanings inside and outside VR (Figure 1).To audiences, it is a dance; to performers, it is a task to design a particular item of clothing. However since the performer is wearing a VR headset, her perspective is also considered by the audience. Instead of building an environment that is coherent between observer and actor, we deliberately create a *discrepancy* between audience and performer. The result is a performance about the unexpected and misunderstood nature of human-created digital environments.

The performance is timed for 10 minutes. It begins with the performer wearing a VR headset walking towards the center of the room. A member of the audience stands at the opposite side of the room where the performer first faces. The performer slowly ramps up her motions, starting from simple strokes and movement at the base and floor level and getting faster, sharper, and more elaborate with her movements as she goes along (Figure 2). Meanwhile the audience has no idea what she is actually seeing, but rather only know that she is dancing a routine that appears to have something to do with what she is seeing. The environment she is seeing is in the audience's imagination, and everyone has her own interpretation. They can only imagine what the grace and agility of the movements stem from, what beautiful world they are witnessing behind the veil. Audience can also make guesses about why the performer's gestures change over time as she starts at the base and work her way up, and the intrigue of the piece comes from what the audience believes the story to be.
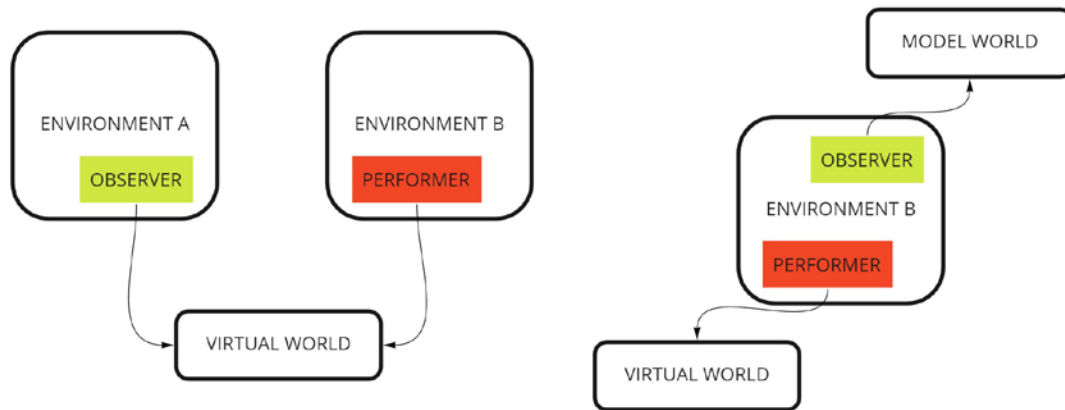
Figure 1: (**Left**) The canonical approach to VR performance: align observer and performer perspectives in the arena of their virtual performance, so that what performer does in the virtual world is understood, and reflected back if necessary (by projection or mixed reality) back into the observer's environment. (**Right**) Approach taken by *The Skin of Our Sheath*, where observer only has external access to what the performer is doing, but by knowing that the performer is acting in a virtual world, the observer must necessarily have a model story for what the performer might do. This creates suspense as the observer keeps track of different possible model worlds that the performer may be in by considering these hyper-realities.

Figure 2: (**Top**) Dance movements early in the performance as the performer constructs the base and skeleton of the garment. (**Bottom**) Dance movements near the end of the performance as the performer polishes the collar and sleeves.

To make the movements believable, we improvise the movements based on hours of training in making strokes and gestures in Tilt Brush while seeing what our movements are like to outside audiences. We choreograph and train in an unfamiliar loop where we have to create the garment design in a relevant and functional way while still showing our movements to the audience in a completely different stylistic manner that activates their imagination, but subverts it ultimately. This practice requires both the technical creative as well as the movement creative, as we improvise collaboratively in both digital and physical worlds using embodied gestures that inform in both.

4 OUTCOMES

At the conclusion of the performance, the audience sees a projection of what the creation is, and a few members of the audience will be the opportunity to see the model created in the headset. For each performance, a different object is created, but the theme is the same. The spoiler for the show is the following: the performer designs a piece of clothing for the standing audience member in 10 minutes according to her size, shape, and mood. It is a constructive and functional drawing process in VR embodied in the gestures that the performer makes in both physical and virtual reality. The end product is a 3D model of a garment (Figure 3). This work is thus related to a previous project where painters painted on clothing of participants within a time limit [10].
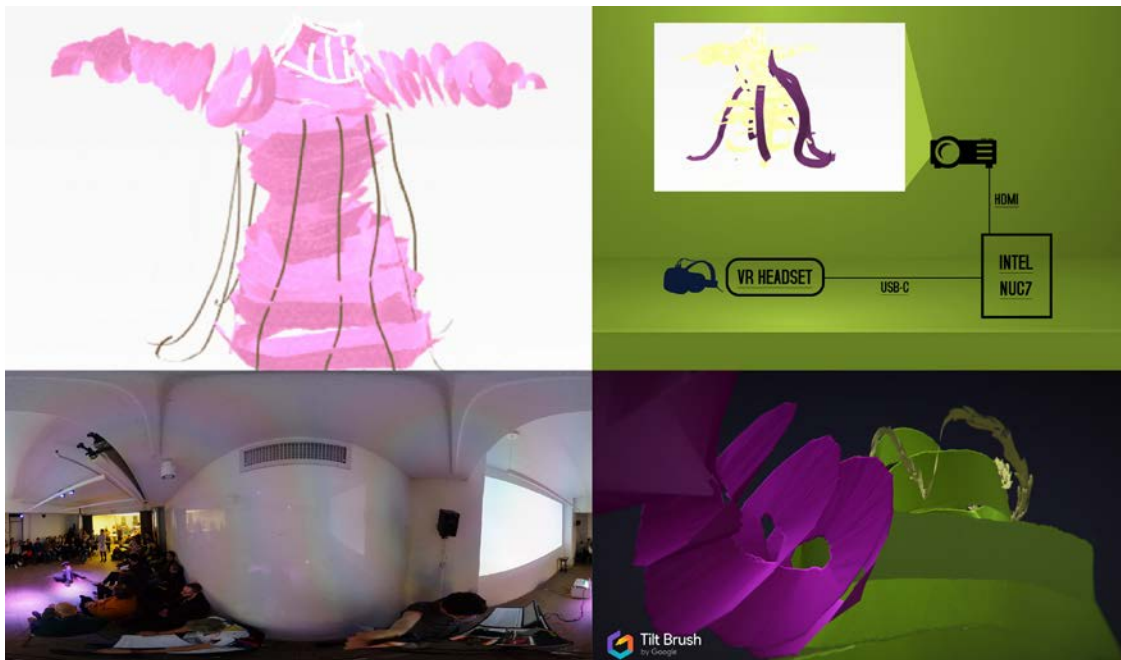

Figure 3: (**Top Left**) An example finished design at the end of a performance. (**Top Right**) A system for projecting the final design to audiences after the dance part of performance. (**Bottom Left**) Performance venue in 360. (**Bottom Right**) View of the 3D garment designed as seen inside the headset in Tiltbrush (which can be projected to audiences after the dance).

The reality of the situation is what the audience sees, but to capture what the performer actually does in VR, see the entire performance at https://youtu.be/gRVO8CuW4wQ with the digital creation process, every stroke, as picture-in-picture. Keep in mind that the audience never sees this, but only sees post-hoc the 3D design.

We make up stories about what people are doing based on the single point that there is another story in another world. When we watch people engage in movements in a digital world of their own with grace and dexterity, we imagine a world all our own to match that beauty. What they are actually doing in the digital world can be simple or absurd, complex or coherent, but we can only sit back and marvel at the unseen, because it is unseen.

SUPPLEMENTARY MATERIALS

Concept video of the performance can be seen at: https://vimeo.com/394947962

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