

Theater and Virtual Reality

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1 Introduction

I started working with VR in 1995, and have always considered it a theatrical medium. I studied at the Electronic Visualization Laboratory, at the University of Illinois at Chicago, which developed the CAVE VR system. In the earliest papers describing this system, it was referred to as a Virtual Theater [4]. Virtual Reality is now a term used to describe many virtual spaces, such as on-line worlds and multi-user games. But today I am using the term to describe a more elaborate system that is designed to support the user's senses more fully. The CAVE and Head Mounted VR systems typically support stereo vision and are designed to completely immerse the user in 3D graphics. Tracking technology is necessary to allow the system to draw the graphics from the user's POV, and also to allow the user to impact the world more directly. The user can reach out and virtually touch, grab, pull, or hit objects in the world.

I was initially interested in Virtual Reality as a site for dramatic first-person experience. I envisioned an intimate theater for one person, who would act as a protagonist in her own drama. Later I became involved with creating and staging networked VR events, and I became interested in the potential for creating performances in shared virtual environments. More recently I have also become interested in mixing the virtual and the real, in mixed reality and mixed media environments, and in playing with the relationship between live and virtual performers and performances. Today I will talk about my work with networked VR, mixed reality and mixed media.

2 Networked VR and Theater

In the early 2000s I was part of a flexible group of collaborators who made networked VR art projects for display in CAVE or CAVE-like systems [5, 8]. The exhibits were typically networked between four to eight locations in the US, Europe and South America. At each remote location, the participant "driving" the VR experience wore a tracking system. Typically they had a tracking sensor on their heads and on one or two hands. This simple tracking system is immensely effective in imparting a sense of life to the avatar - the graphic representation of a person as she appears in the virtual world and to all the other participants. One audience participant commented on the sense of co-presence evoked by being able to see the small, natural movements of other avatars, as they stood around talking, looking at each other, running over to show each other objects, pointing, gesticulating. The avatars that were created by the various creative groups were all different, they ranged from a smoothly curved abstraction that evoked ideas of whales and water-eroded rocks, to a green robot, to Greek statues to Norse Gods. Many researchers suggest that a photo-realistic level of detail is necessary in order for people to feel immersed in a believable world. Others argue that "realism" is not only, or mainly, about how things look in a virtual world, but how they move and respond. My experience in these shared VR spaces indicates that a more abstract avatar, coupled with natural body language, often reads as a living "person" better than the photo-realistic (but never really human) humanoid.

One of these networked projects, *The Incarnation of a Divine Being* by The Tools for Creativity Studio of the Interactive Institute (Umea), was explicitly a theatrical production [6, 8]. Avatars from the different countries involved entered a virtual amphitheater and a trained actor (physically located in Sweden) led them in a supported improvisation based on a Greek tragedy. The actor assigned roles, then revealed that the King was dead, and started to accuse different avatars of his murder. A chorus comprised of computer-controlled characters sitting

in the amphitheater reacted to the avatars' responses. The chorus was controlled from a keyboard at the same location as the actor.

Many of the same artists worked on this networked collaboration for several years and semi-routinely met each other in VR. Very often the main audience for an exhibition was at one particular location and the artists themselves joined from the other locations to discuss their work. Encouraged by our performance experiences in the *Incarnation of a Divine Being*, we began to evolve community performances to demonstrate the different art applications. So groups of avatars would jam together on the drums and sequencing machines of *Beat Box*, created by Margaret Dolinsky; conduct virtual water fights in *Looking for Water*, created by Dan Sandin; or dance together in PAAPAB, the dance-floor application I developed with Dave Pape and Dan Neveu. PAAPAB is populated with both avatars and life-size computer characters. When the user enters recording booths in the environment and dances, her movements are recorded and the motion-capture data is used to animate the character

These experiences made me interested in using networked VR for more formal theatrical presentations. I was particularly interested in mixing avatars of real people animated in real time by the tracking system and virtual characters animated with recording data from the same tracking system and so visually indistinguishable. My interest led to *Human Trials*, a networked, virtual, participatory drama with human actors, intelligent agents and smart sets created by my collaborative group, the Intermedia Performance Studio (IPS) a collaboration with Sarah Bay-Cheng (actor/performance theorist), Dave Pape (VR & computer graphics researcher), and Stuart C. Shapiro (artificial intelligence researcher). *Human Trials* explores the intersection of virtual reality and embodied performance through an event designed both as an immersive experience for one participant, and as a non-immersive production for a live audience.

The participant enters the virtual world from a projection-based VR system and interacts with a variety of computer controlled actor-agents, and two characters, Filopat and Patofil, played by human actors wearing head mounted displays (HMDs). Rather than involving solely human actors, as in a traditional drama, or entirely computer-driven agents, as in a video game, the performance combines both. This gives the advantage of actors, to improvise and to adapt to an unpredictable human participant, while allowing agents to fill out the world and take the roles of several minor characters. We make use of a networked virtual environment to bring the actors and agents together, all of them appearing as avatars in the shared world. In view of our intercontinental networking history it is a counter-intuitive innovation to locate all the networked participants in the same physical location. However, this allows the larger audience to watch the actors and multiple projections of the virtual action showing the points of view of each of the three main protagonists in the drama. We define *Human Trials* as an intermedia performance. The concept of intermediality [1] is gaining ground in theater and performance studies, as the critical intersection of live embodied performance with cinema, television, and digital technology [2, 7, 3].

I will speak about *Human Trials* in more detail in the workshop tomorrow, and just make some general remarks about using networked VR as a performance medium today. Firstly I think it is a medium with great potential which could lend itself very well to spectacular theater. Heros could battle computer-controlled dragons; avatar Valkyrie could swoop in on savage, computer-generated mounts; a 3D autonomous Burnham wood could march to Dunsinane. This medium also provokes many questions about presentation; should the audience view both the real and avatar "bodies" of the actors? how many viewports into the virtual world can an audience handle? should the audience move from viewport to viewport? and perhaps most importantly, if there is to be an aspect of audience participation, how can that best be managed? In *Human Trials*, all participants were in the same location, but of course the performance could take place simultaneously in remote locations, in this case technical and logistical issues become more problematic: there may be network delays which degrade the graphics and make sound incomprehensible; set up, rehearsal and performance across time-zones can be challenging.

3 VR, Mixed Reality, Mixed Media

In the remaining time I would like to briefly describe some recent and projected projects the Intermedia Performance Studio is producing as part of its ongoing mission to integrate digital technology, interactive fiction, virtual reality, and embodied performance.

We took part in the ongoing *365 Days/365 Plays* festival in the US. Starting in November 2004, Pulitzer-Prize winning playwright, Suzan-Lori Parks wrote a play a day for a year. Starting in November 2006 regional and university theatres are producing the full year of Parks' plays in their originally written order. The festival requires that groups put the plays on during the week they are written, but not on the exact day. The Intermedia

Performance Studio in conjunction with the Department of Theatre & Dance at the University at Buffalo produced the plays for week 24 (April 23 - April 29). Each play is very short - a few lines to a few pages long. Parks wrote three additional plays she calls constants that can be added to any group's complement of 7 plays. The IPS performed our seven plays framed by two of the constants twice during our week. There were no overt links or connections between the plays although the production team detected some common themes, for example questions of personal, institutional and environmental uses and abuses of power. Each play used media and live performance in different proportions. The first play started with 3D backdrops created from 19th century 3D postcards and involved camera-tracked actors manipulating virtual plants. The second play combined a slowly transforming digital image at the back and two large scale side projections of 50s television footage which the actors reacted to. The third play was entirely performed by intelligent agents. The fourth play started as video footage on a thin scrim which was then lifted by the single performer. The fifth play featured a tracked actress with a large computer graphic projection of her ego which was animated by the tracking system in real time. The sixth play involved multiple actors, a back projection which included images of the audience, and two side video projections of one main actor, who then entered the scene as a live performer. The seventh play was performed by actors with a large looping video image of the author Parks behind them.

Several members of our group were particularly taken with the digital projection of the ego in play five of our week of *365 Days/365 Plays* and re-used this idea in *D-I-Y Divas*, a performance at the 2007 Buffalo Infringement Festival. *D-I-Y Divas* literalizes fantasies of self-importance, celebrity and stardom in a participatory, real-time, virtually created, personalized Diva event. Drawing from the elite Diva tradition, Guitar Hero karaoke, and the contemporary "fame-for-all" movement, D-I-Y Diva offers participants the opportunity to perform their own Digital Diva for an audience.

The performance is introduced by three Digital Divas, created by the IPS group. The performances are self-contained articulations of a variety of Divas designed to highlight the self-absorption and obsession of the Diva figure. They feature song, found text, original material, and an autonomous virtual Diva. The pieces appear as embodied performances with a virtual projection of the ego following the tracked movements of the actors. After this demonstration, audience members can select from a variety of digital projections and either create their own text, or select existing quotations from a range of Diva personae (including Winston Churchill, Gloria Swanson, Paris Hilton, and Muhammad Ali, among others). The spectator-come-Diva then puts on the tracking system and performs the newly created persona.

Looking into the future the Intermedia Performance Studio is planning a collaboration with an experimental theater company, the Real Dream Cabaret. The production will be based on two texts, Buchner's *Woyzeck* and Jarry's *Ubu Roi*. The concept is to combine the plays by nesting them recursively, a tactic taken from Bunuel's *The Discrete Charm of the Bourgeoisie*. So scenes from *Ubu Roi* are nested into the carnival performance in *Woyzeck*; then scenes from *Woyzeck* are nested into the crowing ceremonies in *Ubu*; and so forth. Our plan is that each nested layer should take place in a different media, and the media we anticipate using include live performance, virtual reality, mixed reality, 3D film, video and puppetry.

References

- [1] Franz-Josef Albersmeier and Volker Roloff, editors. *Literaturverfilmungen*. Suhrkamp, Frankfurt am Main, 1989.
- [2] Philip Auslander. *Liveness: Performance in a Mediatized Culture*. Routledge, London, 1999.
- [3] Freda Chapple and Chiel Kattenbeltr. *Intermediality in Theatre and Performance*. Rodopi, Amsterdam, 2006.
- [4] Carolina Cruz-Neira, Dan Sandin, and Tom DeFanti. Surround-screen projection-based virtual reality: The design and implementation of the cave,. In *Proceedings of SIGGRAPH 93 Computer Graphics Conference*, pages 135–142. ACM, ACM Press / ACM SIGGRAPH, 1993.
- [5] Margaret Dolinsky, Josephine Anstey, Dave Pape, Julieta Aguilera, Helen-Nicole Kostis, and Daria Tsoupikova. Collaborative (v)irtual (e)nvironments (a)rt (e)xhibition. In *Proceedings of SPIE-IS&T Electronic Imaging*, volume 5664, January 2005.
- [6] The Tools for Creativity Studio of the Interactive Institute (Umea). Incarnation of a Divine Being, 2001. <http://w3.tii.se/en/project.asp?project=317>.

- [7] Jon McKenzie. *Perform or Else: From Discipline to Performance*. Routledge, London, 2001.
- [8] Dave Pape, Josephine Anstey, Margaret Dolinsky, and Edward J. Dambik. Ygdrasil - a framework for composing shared virtual worlds. *Future Generation Computing Systems*, 19(6):1041–1049, August 2003.