dream.Medusa: A Participatory Performance

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Abstract. We describe a system which allows several audience members to participate in a performance of an interactive media piece. The performance is created using Max/MSP and Jitter, and is controlled by live voice as well as by participant-operated manipulated objects. The performance was created as part of an interactive art exhibit exploring a night of dreaming and was devised in order to explore the experience of lucid dreaming. We discuss our experiences with the performance and the potential use of participatory performance as a vehicle for exploring wider issues in interaction design.

1 Introduction

In our previous work developing multimedia performance spaces, we have focussed primarily on performer driven interaction techniques, such as systems which allow a performer to interact with an animated character [9] and interactive video systems [8]. These systems are in essence structured around the performer, allowing only the performing artist to shape the development of the responsive performance. Our goal is to explore interactive media pieces in which participating audience members' contributions modify and manipulate the development of the ongoing performance. Previous artists have developed responsive creative environments which enable audience members to transition from passive spectators to active participants in a performance. These include Sheridan's responsive *iPoi* performances [7] and Winkler's sound and video installation *Light Around the Edges* [10].

dream.Medusa is an interactive media work which allows participants to interact with a responsive video system by manipulating specially created objects and exploring how their manipulations change a video visualization. Each performance of the work is necessarily unique, as the discovery and exploration process each participant undergoes as s/he learns to control the video environment using the control devices is different. The conceptual basis of *dream.Medusa* is the exploration of the experience of lucid dreaming [11]. Participants are provided with tools to interact with and control aspects of a simulated dream, represented by the responsive visual display.

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In addition to being a compelling and dynamic art form, we believe that participatory performance allows us an opportunity to explore human-computer interaction in a non-traditional setting. Participatory performance has the potential to assist us in our ongoing exploration of participants' interactions in performance environments. It is our hope that our observations will reveal context-sensitive insights into collaborative creative behaviour that could be integrated into the design of interactive systems for everyday use. After a describing *dream.Medusa* we discuss its role in an emerging programme of research which uses artistic practice to inform interaction design, and describe how our development strategy and project goals fit within that context.

2 The dream.Medusa Performance

In contrast to our previous work, *dream.Medusa* has a performance frame that incorporates not only the actions of a live performer – a singer – but also includes a group of four participants who help create the performance which the spectating audience observes. This characterization of roles in partipatory performance design was devised by Sheridan *et al.* [7] and as they have noted, each repetition of a partipatory performance is uniquely shaped by this interplay between performers, participants and spectators.

The singer sits in front of a video screen, four participating audience members join her in the 'staging' area, and the remaining spectators watch from a distance

Fig. 1. Participants interacting with the responsive video environment

(see Figure 1.) During the performance, hypnotic visual images (videos of floating and drifting coloured jellyfish) are projected upon the large screen. As the singer vocalizes, her vocalizations are visualized through colour and imagery which is superimposed on the underlying video stream. The size of the screen, and the proximity of the participants to the display ensures that the visualization fills as much of their visual field as possible, helping immerse them in the audiovisual experience.

The four participants each hold a controller device with which they are able, at key points in the performance, to modify the playback of the video streams. The movement of each participant's controller modifies a different, mutually orthogonal aspect of the video playback. The combination of the singer's vocal manipulations and the interactions of the participants holding control devices determines the appearance of the video visualization. The participants are in no way practiced users of the system – they are audience members who are experiencing the performance for the first time while participating in its creation. They are instructed simply to explore the interactive objects and to try to learn how to control the visualizations so as to produce pleasing visual effects.

3 Voice Controlled Interaction

In order to allow the performer to interact with the video environment, her live singing is analyzed by the `fiddle~` object developed for Max/MSP [2] by Puckette *et al.*[6]. This object outputs the harmonic spectrum of the vocal stream. Using the same strategy developed to allow vocal input to be used as a control mechanism in our previous performance piece, *Deep Surrender*[8], each of the first three partials in the harmonic spectrum are mapped to the red, green and blue components of a Jitter video stream. This video stream is then superimposed over the underlying video footage; the resulting effect being that the singer's voice causes coloured images to appear and disappear on the screen as she sings.

Mapping the partials in the voice to the colours in this way allows the performer to manipuate the colour of the imagery by making subtle changes to her vocal timbre. This mapping is highly responsive and allows the singer to exercise fine control over the imagery by being carefully attentive to the video manipulations as she modifies her vocal tone.

4 Participant Control

In addition to allowing the singer to direct the development of the performance, we also allow four audience members to function as participants in the performance. We provide them with deliberately mysterious objects – mirrored tubes, which (unbeknownst to the participants) contain Nintendo Wiimote devices (see Figure 2.) Akamatsu's `aka.wiimote` plugin for Max/MSP[1] allows us to obtain orientation data from the 3-axis accelerometers contained in four Wiimote devices and use it to interact with the Max/MSP and Jitter environments.

Fig. 2. A participant holds the controller object

Our participants are told that at various points in the performance their object will signal to them, via a pulsating "heartbeat" sensation, that it is activated. The participants are told that when their object is activated they will each be in control of an aspect of the video playback. They are not instructed as to how to control the object, rather they are encouraged to play with the object, manipulate it, and attempt to identify what aspect of the visualization they are controlling, and how.

When the participants move the control devices, the accelerometers contained in the Wiimote provide Max/MSP with readings indicating the orientation of the device. These orientations are then mapped to the control parameters of the video playback, so the participants can maniupulate the video parameters by waving and rotating the device. Each object is mapped to a different video parameter, so each participant has a different aspect of video playback to control. The four objects are mapped to colour balance, colour saturation, video blending, and edge detection. During the performance, different combinations of objects become activated simultaneously. This mapping also shifts through the course of the performance so the participants' attention must remain focussed in order to maintain understanding and control of how they are changing the video playback.

While the participants may simply focus on their own interactions and responsive parameters, they may also choose to deliberately work together in order to create pleasing visualizations. We have on occasion observed participants attempting to coordinate their actions with those of other participants in order

to explore the visualization space, while at other times the group dynamic is such that the participants choose to function independently, each exploring the effects produced by his or her own controller object.

Neither approach is encouraged or discouraged – the participants are free to directly talk or communicate with one another, or with the performer. The physical set-up of the staging (a traditional staged format with the participants and performer separated from the audience, with the participants facing the screen rather than the audience) facilitates the ability of participants to talk quietly or make eye contact with one another if they so choose without feeling that their interpersonal interactions are being overly observed by the viewing audience.

5 Artistic Concept

The system was used to create a fifteen minute performance exploring the concept of lucid dreaming, titled *dream.Medusa*. In a lucid dream, a dreamer becomes aware that s/he is not awake, but rather s/he is dreaming [11]. Through that conscious realisation that reality is in fact fantasy, the dreamer becomes able to interact with the dream environment and can enact change in the dream world. Of course, as anyone who has experienced this phenomenon knows, control of a lucid dream can be fleeting, and the dreamer often either loses conscious control of dream events, or awakens entirely.

We attempt to explore this idea of conscious control of dreamscapes through our activation and de-activation of the participants' control devices. The participants are immersed in the dream (represented by the video projections and musical performance) and at certain points, become aware that they have control of their environment via the control devices. Symbolically, the appearance of the devices themselves (the mirrored tubes) refers to a classic technique described in lucid dreaming literature, whereby dreamers are encouraged to examine mirrored reflections in order to identify oddities which may signify that reality is in fact a dream [5]. The participants move in and out of control of the visualization, as they would move in and out of control in a lucid dreaming scenario, with the simulation of the dream environment facilitated by the large scale audiovisual display.

6 Performance History

dream.Medusa was presented at Toronto's 2007 Nuit Blanche festival, as part of an installation exhibit which took visitors through various stages of the human sleep cycle. Since then, it has been peformed in concert and workshop settings in Mexico City and Newcastle upon Tyne. Participants have included non-English speakers who communicated with the English speaking performance team via gesture and the rudimentary assistance of an informal translator in order to explore the performance scenario. In another occasion, the piece was performed by a team of professional dancers who after considering the possibilities and limitations of the interaction system chose to attach the controller devices to

their arms in order to use larger gestures to manipulate the video environment. Performing with each of these varied participant groups presented new challenges, as well as produced different performative results. The participants in Mexico City included a small child and his mother which engendered a relaxed and spontaneous group dynamic, fostering a high level of inter-participant collaboration, while the more formalized dance team employed a different strategy for controlling the visual environment, using their experience and training in the art of modern dance to interpret and mimic the jellyfish visualizations while controlling the Wiimote interactors.

Discussions with participants indicate that they found the participatory experience to be rewarding. In most cases, participants have been able to control the interaction objects within the performance's timeframe, and they have told us that they found the visualization and musical components to be evocative and enjoyable. Individuals have told us that they felt a sense of responsibility and contribution to the development of the performance (one participant remarked that "up there, we are all in it together, so we have to make it look good!").

7 Participatory Performance and Interaction

It is our hope that the observations we make, and the experiences we have when collaborating with our participants to peform pieces like *dream.Medusa* could be applicable to future design of creative collaborative systems. Existing non-traditional approaches to interaction design such as Cultural Probes [3] which encourage participants to respond to designers using a variety of media including photography and audio recording, or the ViP method of product design [4] which encourages designers to imagine the desired emotional responses they would like their designed product to evoke represent strategies and experimentation grounded in aesthetic practice, and illustrate the value of conducting design research in ways which at first may seem indirect, but due to their open-endedness yield unexpected and previously unexplored design options and opportunities.

We believe that when designing creative collaborative systems, participatory performance can offer a non-traditional environment within which insightful observations could be made about participant interaction. Participants in an interactive performance have unique incentives which encourage them to engage in creative behaviour, such as the desire to appear competent in front of an observing audience [10] and the desire to provide to the audience an aesthetically pleasing performative experience [7]. These motivations are obviously different than those of participants undertaking activities in a traditional laboratory or field-study setting, and it is our hope that this will reveal alternative facets of their approaches to interaction with responsive systems.

We document performances of the piece via video and note-taking, and are compiling a body of observational and anecdotal data from our experiences. It is our goal that from the behaviour of our participants in this, and in future participatory performance projects, previously unexplored insights into participant interaction in collaborative creative spaces will be uncovered that will inform the design of interactive multi-user systems.

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References

1. Akamatsu, M.: aka.wiiremote, http://www.iamas.ac.jp/~aka/max/
2. Cycling 1974. Max/MSP and Jitter
3. Gaver, B., Dunne, T., Pacenti, E.: Design: Cultural probes. Interactions 6(1), 21–29 (1999)
4. Hekkert, P., van Dijk, M.B.: Designing from context: Foundations and applications of the ViP approach. In: Designing in Context: Proceedings of Design Thinking Research Symposium, vol. 5, pp. 383–394 (2001)
5. LaBerge, S.: Prolonging Lucid Dreams. NightLight 7(3-4); The Lucidity Institute
6. Puckette, M., Apel, T., Zicarelli, D.: Real-time audio analysis tools for Pd and MSP. In: Proceedings of the International Computer Music Conference, pp. 109–112. International Computer Music Association (1998)
7. Sheridan, J.G., Bryan-Kinns, N., Baylss, A.: Encouraging Witting Participation and Performance in Digital Live Art. In: 21st British HCI Group Annual Conference, Lancaster, UK, September 3-7, 2007, pp. 13–23 (2007)
8. Taylor, R., Boulanger, P.: Deep Surrender: Musically Controlled Responsive Video. In: Butz, A., Fisher, B., Krüger, A., Olivier, P. (eds.) SG 2006. LNCS, vol. 4073, pp. 62–69. Springer, Heidelberg (2006)
9. Taylor, R., Boulanger, P., Torres, D.: Visualizing Emotion in Musical Performance Using a Virtual Character. In: Butz, A., Fisher, B., Krüger, A., Olivier, P. (eds.) SG 2005. LNCS, vol. 3638, pp. 13–24. Springer, Heidelberg (2005)
10. Winkler, T.: Audience participation and response in movement-sensing installations. In: Proc. of the International Computer Music Conference (December 2000)
11. van Eeden, F.: A Study of Dreams. Proceedings of the Society for Psychical Research 26 (1913)