

Experiences in Designing Experiences

Phoebe Sengers

Faculty for Computing and Information and
Department of Science & Technology Studies
Cornell University
Ithaca, NY 14853 USA
+1 607 254-5396
sengers@cs.cornell.edu

ABSTRACT

In turning from functional, tool-like systems to ones that should be fun, we open the possibility and need to think carefully about what it means to design experience for human users. Here, I describe my experiences building a set of interactive installations in the domains of interactive computer characters, virtual reality, and affective computing, through which I have tried to support a richer conception of human experience of information systems than is traditionally used in computer science. In order to achieve this I draw inspiration from cultural studies of technology and design.

Keywords

Media theory, media research, critical technical practices

INTRODUCTION

One of the basic tenets of media theory is that media have the ability to shape subjective experience in specific ways. This is particularly true when applied to interactive media, which through their affordances shape human activity and thereby our experience of interacting with the world. Given that this is the case, it is disturbing that much of traditional computer science research is based on extremely limited assumptions of what human experience is like, focusing on work-related notions of problem-solving, efficiency, and productivity (see e.g. [1, 6]).

The bulk of my work focused on how other kinds of experiences can be represented in and created by interactive media systems. I combine cultural analysis of technology - what kinds of experiences are represented? What kinds of experiences are left out, but should be considered? - with systems-building focused on actually creating new kinds of experiences.

INTERACTIVE COMPUTER CHARACTERS

Traditionally, Artificial Intelligence focuses on activity in the world as problem-solving rationality. The goal for autonomous agents is often to behave optimally rationally in approaching some goal. For interactive computer characters, this focus is problematic, since characters do not need to be particularly smart or rational, instead needing to project emotion and personality in a way that is understandable to users. In the Industrial Graveyard, I explored how to create agents, not as rational problem-

solvers, but as experienced by human users [3]. The technology is based on narrative psychology, which argues that humans interpret activity by organizing it into narrative. I support human interpretation of character action by providing visible cues for narrative interpretation of agent behavior, most notably through transitions between behaviors which connect them by expressing the reason for the behavior change to the user.



Figure 1: A pathetic character from the Industrial Graveyard

VIRTUAL REALITY

With a team of 5 researchers led by Simon Penny, I explored the construction of physical experiences in virtual reality. In traditional VR systems, the body is an afterthought, left behind when the headset is put on. The goal of Traces [2] was to develop a kind of VR installation where it is possible to have strong bodily experiences.

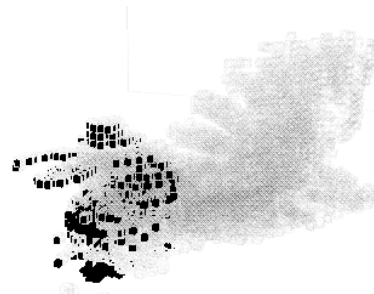


Figure 2: A user (black) moving through Traces leaves behind traces of physical movement (gray).

Traces is an installation for the CAVE VR display, a small room onto whose walls 3D images are projected, creating the illusion of being surrounded by virtual objects in real, physical space. In Traces, vision cameras detect the movement of users, allowing them to leave behind and interact with traces of physical movements. Gradually, the

traces become more autonomous, turning into “Chinese dragons” which flock together and sense and react to users’ physical movements.

Traces was installed at Ars Electronica ’99, where users leapt, ran, skipped, did cartwheels, and came out of the CAVE sweating. Users had strong reactions to the Chinese dragons; though the dragons were not particularly intelligent, they seemed strongly alive and present to human users because they shared the same physical space.

AFFECTIVE COMPUTING

The Influencing Machine [4,5], developed by a team of researchers at the MARS Exploratory Media Lab as part of the EU SAFIRA project, is a system which explores human reaction to affective computing, or computational systems which recognize, reason about, or can express emotions. In the Influencing Machine, users enter a small room, in which they see children’s drawings and hear an abstract soundscape. In the middle of the room, they discover a wooden mailbox, into which they can put art or colored postcards. By choosing postcards, they can change the “mood” of the drawings and sounds. Users explore the postcards, asking themselves what the picture means to them, and exploring what it means to the machine.

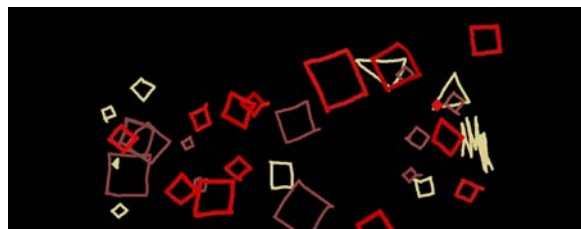


Figure 3: Input (top) and output (bottom) of the Influencing Machine

The Influencing Machine is currently being evaluated by Gerd Andersson, Pia Mårtensson, and Kristina Höök at the Swedish Institute of Computer Science. In public demonstrations of the system at the CAST ’01 conference and in permanent installation at the MARS Exploratory Media Lab, users are intrigued, debating whether and how the computer can be said to have emotions as they engage in interaction for up to 20 minutes.

DISCUSSION

With the Industrial Graveyard, I started out being interested in how human experience was represented in agents; but in the course of building the system, I began to realize that what was central was the way in which the *user* experienced the system. With Traces, it became clear that physical interaction and shared physical space with

(embodied) users is a way to create meaningful, powerful experiences. With the Influencing Machine, we came up with ways to engineer *enigmatic* experience: the interaction is deliberately open-ended and open to interpretation, yet through the interaction of postcards, graphics, and sound, we can create experiences which have concrete meaning for many users.

The three systems are all examples of critical technical practices [1], or practices of technology development which incorporate a cultural, critical component. In all three cases, we built on an analysis of what was missing in the cultural assumptions about human experience that were unconsciously built into previous technology. The Industrial Graveyard twists the notions of optimality, correctness, and action-selection inherent in many algorithms for autonomous agents. Traces alters the assumption of bodilessness behind many VR applications. The Influencing Machine plays off of the assumption in many affective interfaces that “affect” is something to be extracted through surveillance or skin contact, and instead places the user’s own choices at the center of affective interaction. I believe building rich, meaningful experiences will require not just technical competence but also cultural analysis, design, and art perspectives.

ACKNOWLEDGMENTS

The Industrial Graveyard was supported in part by an ONR Allen Newell Fellowship. My work on Traces was supported by a Fulbright fellowship. The Influencing Machine is part of the EU SAFIRA project. This work was done at Carnegie Mellon University, the Center for Art and Media Technology (ZKM), and the MARS Exploratory Media Lab at the German National Information Technology Research Center (GMD).

REFERENCES

1. Agre, Philip E. *Computation and Human Experience*. Cambridge: Cambridge UP, 1997.
2. Penny, Simon, Jeffrey Smith, Phoebe Sengers, Andre Bernhardt, and Jamieson Schulte. Traces: Embodied Immersive Interaction with Semi-Autonomous Avatars. *Convergence*. Vol 7, No 2, Summer 2001.
3. Sengers, Phoebe. Designing Comprehensible Agents. 1999 International Joint Conference on Artificial Intelligence (IJCAI-99). Stockholm, Sweden, August 1999.
4. Sengers, Phoebe, Werner Magar, and Boris Müller. The Mailbox: An Intuitive, Tangible Input Device for Affective Experiences. Short Paper submitted to CHI ’02.
5. Sengers, Phoebe, Rainer Liesendahl, Werner Magar, Christoph Seibert, Boris Müller, Thorsten Joachims, Weidong Geng, Pia Mårtensson, and Kristina Höök: The Enigmatics of Affect. Submitted to the 2002 Conference on Designing Interactive Systems.
6. Suchman, Lucy. *Plans and Situated Action*. Cambridge: Cambridge UP, 1987.