

OUROBOROS

Closing the Loop on Surveillance Technology

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Abstract:

As surveillance increases, both seen and unseen, the roles of spectator and spectacle become interrelated in complex ways. This relationship is the primary focus of our inquiry, experimentation, and project development. The attempt to close the "loop" on the traditional on-way path between performer and audience, spectator and spectacle, observer and observed is the heart of the project, and will be explored through software development, audiovisual interactive technology, and the creation of an installation space for theatrical production. Ouroboros, the mythical dragon or snake that eats its own tale, illustrates our idea of closing the loop on audiovisual technology by turning passive spectators into active participants. For the GROCS Projects Showcase, we will produce and present a public theatrical production (possibly in the Video Studio in the Duderstadt Center) in which on-site audience members and on-line visitors are "virtually" incorporated into the choreography or performance with surveillance cameras, LCD projectors, simulation software, and a web interface.

Introduction:

We are interested in the way individuals and societies relate and respond to innovative technologies of increased access to information and greater connectivity. The same technologies (e.g. Facebook or YouTube) that are used by grassroots movements to increase democratic participation are also employed to access private information and distribute it to questionable parties. Utopist prophecies and apocalyptic nightmares accompany analyzes of the digital revolution: (1) It is a liberating force that will flatten the earth's hierarchies and bring democratic participation and economic opportunity to every corner of the globe; (Friedman, 2005) or (2) It is a corporate imperial ploy of global surveillance that restricts our every move and criminalizes all political dissent. (Sphinx, 2004) We do not intend to demonstrate the correct analysis, nor to find a middle ground, but to identify how and why people respond differently to varying degrees of access to information, invasion of privacy, and increased connectivity. Based on careful observation and documentation of our process, we wish to identify the technological innovations and social conditions that most help individuals--as artists, performers, or grassroots organizers--achieve their goals and least infringe on their privacy and security. Finally, we wish to help trigger a public conversation--in the university community and beyond-- about the important and interrelated issues of surveillance, spectatorship, and citizenship in the democratic construction of a free society.

Who sees and who is seen? This seems to be a determining factor in people's comfort level in relation to technology. Who controls the tools of surveillance, to what end it is used, and who has access to the resulting information are crucial details in understanding people's reactions to greater connectivity and faster information access. Traditionally, surveillance technologies create a well-defined boundary between viewer and viewed (as in the Lacanian Gaze), scrutinizer and scrutinized (Panopticism in Foucault), as well as the long-held division between subject and object. Under such conditions, the information (video, audio, or otherwise) travels in one direction, privileging the recipient of information over the observed. What happens if the information travels in

the opposite direction, or shuttles back and forth? We speak of "loops" of information or the "loopiness" of the surveillance as the possible paths that information can travel between multiple individuals and across multiple technological platforms. Person A-Technology-Person A= a mirror? Person A-Technology-Person B= surveillance? Person A-Technology-Person B-Technology-Person A= dialogue? And so on. The "loopiness" of the relation between individuals and technology is the purpose of our inquiry and the nature of our projects. The degree to which these loops are open or closed depends on the extent of knowledge that is available to participants about the surveillance in progress. As part of our work, we will discuss with audience members about their reactions and comfort levels to varying degrees of control in the installation space, and how, in turn, it changed the nature of their relation to the performance (e.g. did they wish to participate, did they feel like leaving, etc).

Objectives:

We intend to explore the relationship between surveillance and privacy concerns in the setting of audience-interactive performance. The work that we will pursue as a GROCS-funded team will contain elements of some or all of the following:

1. The development and implementation of, and/or experimentation with, advanced interactive audiovisual software and hardware that connects live audience members to performances in progress. Our goal here is to deconstruct or at least blur the binary distinction between audience and participant, or, more generically, between object and subject.
2. The development of a more refined template infrastructure of software and set design (based on 1) that we will use in our performance or theatrical production (in 3, below), and that can be used by other performance artists, playwrights, etc. in their own productions.
3. The production and presentation of a public theatrical performance (possibly in the Video Auditorium in the Duderstadt Center) in which audience members are "virtually" incorporated into the choreography or performance with surveillance cameras, LCD projectors, simulation software, and a web interface.
4. The documentation and discussion of participant responses to surveillance conditions, and the theoretical and practical inquiry into the relationship between surveillance, spectatorship, and performance.

The final public performance would be part of the GROCS Projects Showcase, at the end of the Winter 2008 semester. We will invite art and theater critics from the Michigan Daily, appropriate faculty and grad students in the School of Art & Design and the School of Music, Theater & Drama, and any interested members of the University of Michigan community. This performance will provide the opportunity to trigger a campus-wide conversation about surveillance and interactive technologies.

Process:

In order to accomplish our objective of staging a final performance in the GROCS Projects Showcase, we will stage practice performances throughout the semester to test our software, hardware, and performance with increasing levels of complexity. This will be an iterative process of exploring how technology can facilitate closing the loop between performers and audience members. We will deploy and evaluate alternative solutions throughout the winter semester as we develop the theatrical production. The basic steps are:

1. The simplest stage is to incorporate real-time footage of invited guests to the installation space as it develops. How do people play, react, and respond to the space?
2. Using a combination of real-time footage and 3D face and body modeling software, more sophisticated video footage will be developed to reconstruct audience members and display their simulated participation in a play or choreography. This project will be developed in stages and tested as it evolves.
3. Because the previous software involves complex programming, we may find out that it is not feasible. In lieu of this complex software, the same performance can be staged with simpler technologies, using photographs of participants instead of 3D models.
4. Lighting, sound, and kinetic sculpture will be programmed to respond to the reactions of audience members and performers.

5. A web interface component will be added to include off-site audience members. These online participants can help shape the physical space of the performance or installation by submitting information or personal data that is then used in the performance.

Related Issues:

Recent advances in information technology have rekindled the age-old struggle over the usage and control of technological innovations. Technologies that connect people at a grassroots level can also buttress social hierarchy and repress dissent. Individuals and organizations have responded to this increase in connectivity with polarized reactions. These topics are surfacing again and again in a variety of academic and social discourse, from film theory and post-modern anthropology to popular media texts.

Connectivity or Control?: In September 2002, the NYC-based “Surveillance Camera Players” organized an international day of protest against video surveillance in public spaces, calling on participants worldwide to stage performance protests in front of surveillance cameras. (2006) Half a year later and halfway around the world, young voters in South Korea sent out more than a million e-mails to mobile phones and online accounts over the span of a couple minutes encouraging disenchanted youth to go out and vote. The cyberspace whirlwind delivered a narrow victory to presidential candidate Roh Moo-hyun, an unlikely contender against the conservative establishment who had been dismissed as an outsider by the mainstream media. (Koh, 2004) Does information technology connect people and encourage democratic participation, or is it a mechanism of control? Web 2.0 reiterates these tensions: Facebook is used by some to organize effectively across geographic distance, and avoided by others who see it as a tool of government or corporate surveillance.

Who sees and who is seen?: In general, surveillance is thought to increase access to information by organizations and people with greater power. That is, people with more capital or with higher social positions have more immediate access to surveillance technologies. We might conclude that surveillance works to the advantage of those in power: corporations, bosses, politicians, etc. Can the opposite be true? A very recent example of this is WikiScanner, a website released in August of this year that can trace the IP addresses (and locations) of computers that edited, censored, or erased important political information on Wikipedia. WikiScanner found multiple cases of censorship or false information edited by government agencies and corporations. (Borland, 2002)

Surveillance vs. Surveying: In the social sciences, the terms by which social scientists observe social phenomena and people is an ethical debate. The difference between surveillance and surveying is the difference between a hidden, possibly exploitative gaze, vis-à-vis a structured, consenting observation. It is the line between these two types of behavior that is becoming increasingly blurred in regards to data mining, and the uses of personal information by corporations, universities and governments. This is discussed directly by J.E. Wade's work, which frames the issue of the roles of the surveyor and the subject, and discusses the responsibility that they hold to each other (Wade, 1984). While there is an accepted, established method for gathering information as survey in the academic setting of social sciences, this does not eliminate the ethical concerns entailed in the collecting and use of that information. What if our project illustrated, in a non-threatening way, the ways that personal information, harmlessly collected, can be manipulated and used in unintended ways?

Passive Audience vs. Active Participants: In the arts, there is a traditional separation between the thing that is perceived (the play, the work of art, the musical composition), and the person or people perceiving (the audience, the viewer, the listener). The drawback is twofold: it commodifies works of art and turns individuals into passive consumers of art. What if audience members become part of an installation, or step up on the stage and join a play in progress? Augusto Boal's "Games for Actors and Non-Actors" (2002) and "Theater of the Oppressed" (1985) provide low-tech examples or 'gamesercises' that can be staged in an interactive play between professional actors and audience members-turned-actors. Boal's model intends to empower disenfranchised members of society in an interactive discussion with each other and with performers.

Privacy vs. Access to Information: Advances in technology and changes in the way that people communicate and store information have steadily increased the vulnerability of informational privacy. This vulnerability is compounded by a combination of increased concerns about citizen security and developments in e-government designed to improve state services and reform the public sector. Starting from a principle of the right to informational privacy, we will review recent technological developments, discuss the dangers they pose to privacy, and propose mechanisms for achieving a better balance between the right to individual privacy and the need for communal security in an information society.

Spectatorship Theory: As the ways viewers consume film changes due to the rise of digital media, the conceptions of who is a spectator and how that spectator can be theoretically defined are changing at a rapid pace. There is a rich historical history of using spectatorship theory to define the reaches of ideology (Baudry) or to launch a political case against an oppressive regime (Mulvey) and our project can in some ways be conceived as a "living" theory piece, a concrete, tangible attempt to realign the idea of a spectator as a cognizant, alert participant in the spectacle, rather than a passive drone absorbing whatever information and ideology is being disseminated.

These related issues illustrate the social complexity of large advances in information technology, as well as the diversity of our team members who come at this problem from contrasting fields, and think of the problem and solutions to it in various ways.

Collaboration:

The way that our group was formed is itself very indicative of the type of collaboration that we expect to experience in the project, and also highlights the community that the GROCS program fosters. Aaron originally placed a call for participants in the GROCS blog, which attracted the attention of the soon to be group members. The idea was further developed in GROCS teas and at group meetings, and it is this reliance on community, even one created "virtually" through blogs and email that sets our group apart. We come from many diverse backgrounds, academically as well as personally, and these differences in experience and expertise only enrich our project and allow us to present a performance that is as multi-lateral and far-reaching an approach on surveillance as the ramifications of the topic itself.

Participant Details:

Aaron Johnson-Ortiz is a first-year MFA candidate in the School of Art & Design interested in the themes of themes of surveillance, spectacle, and performance. In his practice, he is drawn to the process of collaborative work with scholars, technicians, and creative people in general. Theoretically, he is interested in the awkward symbiosis of the repressive force of mass surveillance and the personal experience of global interconnectedness. In 2005, he began an art project related to the 1966 film "The Battle of Algiers", about the Algerian independence from France that demonstrates strategies to bypass checkpoints and organize under a repressive regime. The film took on contemporary relevance in 2003 when the Pentagon held a screening to prompt discussion on insurgency and counter-insurgency tactics. (Kaufman, 2003) For this project, Aaron created an installation space that videotaped audience members and projected their live participations on an adjacent wall. Viewers became viewed, or, to put it differently, audience members became performers. The technical shortcomings of this project provided the impetus for Aaron's interest in this GROCS collaboration. Aaron hopes to gain a better grounding in basic programming and interactive art. For this purpose, Aaron will be learning from his adviser, Michael Rodemer at A&D, who specializes in kinetic and interactive sculpture.

Katy Ralko is a third year undergraduate student in the Screen Arts and Cultures department in the College of Literature, Arts and Sciences. She is interested in the intersection between theory and creativity, whether in cinema, theater or everyday life. She believes that the role of a spectator has changed dramatically through the years as we have moved from Shakespeare's Globe Theater to YouTube, as our personal information becomes public-domain through data collection, user profiling and other practices, causing our lives to become "performed" without our express knowledge or consent. After two summers teaching technology to children across the country, she finds herself keenly aware of the influence of technology on people of all ages. She

hopes that this GROCS project will allow her to explore the idea of surveillance from a multitude of different approaches: academic, artistic, technological, or - ideally - a fusion of all three.

Amadeus Scott is a first year MFA candidate in the School of Art and Design whose work focuses on the relationship between art and anthropology. She has a BFA in Sculpture and a BA in Anthropology from Grand Valley State University. She believes that one of the most fundamental roles that an artist fulfills within a culture is that of an observer. Not only does art provide a lens through which to view the world, it also offers a reflection of the culture to which it is intrinsically tied. As an observer, she is interested in the intricacies of human interactions, the processes by which objects that infuse our lives are created and used by us, and the roles that these elements play in the vast web of human life. There are huge implications to be considered, factored, and compensated for in the construction of artwork, which while it may be personal, is intrinsically tied to culture in all its incarnations of time and space. Her work seeks to create physical manifestations of a dialogue between theoretical components or constructs, and their practical application into tangible and typically unpredictable human culture. Her interests in surveillance include issues of observed vs. observer, and the relationship that we hold to our physical environment and its influence on the construction of our identity. This GROCS project, she hopes, will bring about a cross-pollination of ideas and technologies, which she hopes to integrate into her future work, continuing her dialogue between audience, identity, and environment.

Sayan Bhattacharyya is a doctoral student in the Program in Comparative Literature and is writing a dissertation that partly focuses on theater and playwriting. He also has a B.S. in Electrical Engineering (Jadavpur University, India), and an M.S. in Computer Science (U-M, Ann Arbor). While a student in India, he participated in Bengali-language group theater in Calcutta. He has worked as a programmer/analyst for Tata Consultancy Services, India (where he helped develop operations management software for the Indian tea industry), at the Ecole Nationale des Mines, France (where he helped develop pedagogical software), and at the Great Lakes Research Laboratory, Ann Arbor (where he developed software for ecological modeling). Having made a career switch from computer science to the humanities, he is currently interested in issues related to cultural theory. He will contribute his programming and technical skills to the project, and is excited to finally get an opportunity to combine his twin passions: the magic of the theater, and the magic of writing code. This project will help him gain actual hands-on experience in the application of technology to cultural performance, which, he hopes, will complement his theoretical-level understanding of the issues raised by such applications.

Ben Congleton is a 2nd year PhD student in the School of Information. He has a B.S. in Computer Science, a B.S. in Business Information Technology, and an M.S. in Computer Science with a specialization in Human Computer Interaction from Virginia Tech. At Virginia Tech he led the VT Memex project, and explore the use of Microsoft Sensecam's (Gemmell, 2004) as personal memory aid devices. Last semester he led the GROCS Prospero project, in which he helped build modular interactive public displays -- a work that he continued at Nokia Research over the summer to create public displays that could sense nearby users using Bluetooth cell phones. He is currently working with Professor Mark Ackerman to build a simulator to explore privacy issues in pervasive environments. He sees this project as an opportunity to explore privacy and surveillance from a socially and artistically oriented point of view, which will help him build a comprehensive and interdisciplinary view of a research topic in which he is interested. He will bring his technical expertise, his experience with GROCS projects, and general interest in the topic to the project.

Literature Review:

These works offer a framework from which we seek to draw ideas and influence, providing both insight into the range of ways in which surveillance and the relationship between observer/observed penetrate our daily lives, while at the same time informing our own project aims and choices. Integrated here is a breadth of sources from theory and practice to practical information regarding implementation of technology. This literature also provides a background history for how these issues have developed, and for a deeper understanding of how the individual and the community are shaped by these forces. We intend to utilize this information both as influence and practical guide for the execution of our project.

Arts in Practice

Boal, A. Games for Actors and Non--Actors. New York: Routledge, 2002.

---. Theatre of the Oppressed. Theatre Communications Group, 1985.

Debatty, Régine. "Orwellian Projects" September 11, 2006.

A review of several performance pieces manipulating the terms of surveillance to create awareness of the pervasive nature of these technologies. Of particular note is a man, who after being followed for four months by the FBI as a potential terror suspect who after he was cleared wore a tracking device of his own volition and created a GPS tagged sequence of photographs detailing his every movement and activity. [view projects](#)

Hart, Hugh. "Big Brother, Armed with a Spotlight." The New York Times 2007.

A robotic outdoor sculpture that directs a light beam at passersby using video information from two surveillance cameras in adjacent buildings: [read New York Times article](#)

Kaufman, M. T. "What does the Pentagon See in Battle of Algiers?" The New York Times 7 (2003). [read article](#)

Surveillance Camera Players. We Know You are Watching: Surveillance Camera Players 1996-2006. Berkeley: Southpaw Culture, 2006.

The "Surveillance Camera Players" are a theater troupe who perform in front of surveillance cameras in public spaces, such as NYC's subway stations: [go to Camera Players website](#), [watch performance](#)

Debates in Contemporary Technology

Blanz, Volker, and Thomas Vetter. "A Morphable Model for the Synthesis of 3D Faces." MPI for Biological Cybernetics. 2006.

This facial reconstruction software builds malleable 3D animations from a single photo: [watch video](#)

Borland, John. "See Who's Editing Wikipedia - Diebold, the CIA, a Campaign." Wired 2007.

An article on WikiScanner, an on-line program for tracing edits on Wikipedia to computers. [read article](#)

Boyle, M., and S. Greenberg. "The Language of Privacy: Learning from Video Media Space Analysis and Design." ACM Transactions on Computer-Human Interaction (TOCHI) 12.2 (2005): 328-70.

A discussion of the privacy implications of video media spaces, usually spaces with audio and video links to remote locations. These media space generally provide two way communication between distant parties, and are quite useful for video conferencing, but are often perceived to be invasive and privacy insensitive when the video link is turned on without a specific purpose. The authors introduce a vocabulary for control of privacy in video media spaces: solitude - control over social interactions, specifically attention for interaction and engagement; Confidentiality - control over internet access; autonomy - control over one's own behavior and expression of identity.

Gemmell, J., et al. "Passive Capture and Ensuing Issues for a Personal Lifetime Store." Proceedings of the 1st ACM workshop on Continuous archival and retrieval of personal experiences (2004): 48-55.

The Microsoft SenseCam is a device designed to passively capture a wearer's day. It is worn around one's neck, similar to an ID badge, and passively captures photographs and sensor data as its wearer goes about their daily activities. Users can offload the captured data onto their personal computers, where they can view the captured records of their day using viewing software called "Microsoft Lifebits". The SenseCam is exemplary of a new genre of surveillance, personal surveillance, for personal use -- facilitated primarily by the growing number of camera phones and digital cameras, but also by special purpose capture devices such as the SenseCam.

Hall, Justin. "Passively Online Multiplayer Games." November 21, 2006.

Hall proposes the idea for a program that uses information collected about an online user (websites visited, email address, pictures uploaded, etc) to create an avatar that would participate in a virtual world without the active input from his corporeal counterpart. He calls it a 'system for turning user data into ongoing play', earning points and rewards for various activities he's already completing online, and competing against his friends for the most points. [read article](#)

Koh, Annie. "Smart Mobs for President (South Korea)." How to Get Stupid White Men Out of Office: The Anti-Politics, Un-Boring Guide to Power. New York: Soft Skull Press, 2004. 175-182.

Shachtman, Noah. "The New Security: Cameras that Never Forget Your Face." The New York Times 2006.

This facial recognition software is incorporated into the video-feed mainframe of a building. It builds facial profiles and movement histories of all individuals captured on the building's surveillance cameras. [read article](#)

Theoretical Frameworks

Allison, A. Permitted and Prohibited Desires: Mothers, Comics, and Censorship in Japan. Berkeley: University of California Press, (2000): 147-177

This chapter deals specifically with issues of surveillance and obscenity laws in Japan, examining the permissive nature of sexuality in video and print media, juxtaposed to censorship of specific sexual acts and genitalia in media. It is useful for understanding the variety of cultural permutations of control in the production of media.

Baudry, J. L. "The Apparatus: Metapsychological Approaches to the Impression of Reality in Cinema." Film Theory and Criticism Eds. Leo Braudy and Marshall Cohen (1992): 690-707.

A groundbreaking piece of cinema theory that states that because the apparatus of cinema production and projection is itself a product of the dominant ideology, the product (film) is inevitably imbued with the dominant ideology. Useful in conceptualizing the framework, in which performances are created, and what their intent is, whether intentional or no.

Charney, L., and V. R. Schwartz. Cinema and the Invention of Modern Life. Los Angeles: University of California Press, 1995.

Working through a post-modern lens of film and art theory, this work covers a range of topics pertaining to issues of spectacle and spectator as an identity shaped by the invention of cinema, 'fin de siècle', and the rise of sensationalism in popular Western culture at the turn of the 19th century. Useful for considering how spectator/spectated roles developed in coincidence with film, and the nature and history of Western conceptions of the spectacle.

Foucault, M. Discipline and Punish: The Birth of the Prison. (trans.) Alan Sheridan. New York: Pantheon, 1977.

This classic book is a seminal source in the theoretical understanding of surveillance in modernity. In this book, Foucault traces the evolution and convergence of "panoptic" society (in which the observer (spectator) is all-seeing, paradigmatically represented in the figure of the panopticon) and "carceral" society (in which all of the observed (spectated) are always fully open and visible to the observer's surveillant gaze, paradigmatically represented by the tropes of prison and incarceration).

Friedman, T. L. *The World is Flat*. Farrar, Straus and Giroux, 2005.

Klein, N. *No Logo: Taking Aim at the Brand Bullies*. New York: St. Martin's Press, 2002.

Klein's text offers ranging insight into the influence of social control in regards to the manufacture, distribution, and consumption of goods produced through modern corporate structures. She dissects corporate means of control and surveillance within sweatshops, infiltration of advertisement into public schools, and the consumer as the object of corporate voyeurism. Useful in understanding the range of surveillance that occurs for corporate ends to control laborers, employees, and consumers.

Mulvey, Laura. "Visual Pleasure and the Narrative Cinema" in *The Feminism and Visual Culture Reader*. Amelia Jones. ed. New York: Routledge, 2003

One of the most prominent uses of a psychoanalytic spectator theory as a "political weapon" meant to disable the male dominated societal values that pervade classical Hollywood cinema. Frames the viewer of a performance as a regressed viewer who over-identifies with the gendered male gaze of the camera. Useful in thinking about the psychological state of the viewer of any performance, and how the content of what is projected can influence that state.

Sphinx. "You Won't Find Me on Friendster." *Green Anarchy*. 18 (2004): 18-19

[read article](#)

Wade, J. E. "Role Boundaries and Paying Back: 'Switching Hats' in Participant Observation." *Anthropology & Education Quarterly* 15.3 (1984): 211-24.

This work offers extensive insight into the roles of the observer and the observed, and the implications that this has for how and what type of information is gathered during ethnographic field research. Also implicit in this is the ethical concerns of taking information from a community, and the responsibility that the researcher has with their use of that information and their responsibility to the community in exchange for that information. We hope to draw on the dynamics of this relationship interplay, and gain insight as to the responsibility we have to our integrated project audience.