Editor: Dorée Duncan Seligmann
Avaya Labs

Embodying Robotic Art: Cybernetic Cinematics

Gretchen Skogerson
Rensselaer Polytechnic Institute

> Cinema is the Last Machine. It is probably the last art that will reach the mind through the senses.
> —Hollis Frampton, 1971[1]

If cinema is one of the last machines to come out of the mechanical age, then its legacy of targeting "the mind through the senses" continues in a newer electronic and mechanical art form: gestural robotics. Gestural robotics harnesses microcontrollers and mechanical devices to create sculptural art. Like cinema, it uses a technical framework and repetition to embody ideas and emotions. Each form asks us to harness our ability to suspend disbelief, pointing to the primacy of our internal dialogues and imaginations. The similarities between these two art forms—although separated by leaps in technology, modes of presentation, and historical distance—signals our continued ability to connect with all the facets of our environment. Collectively, the two reinforce the increasingly wide range of creative expressions we've carved out for ourselves, negating anxieties about the isolation of our increasingly technological environment.

We persist in developing both mechanical and technological items in ways that affect our society. However, we codify an art form by its basic parameters. In cinema, it was the finessing of stills to perfection in motion; in robotics, it is the microcontrollers that let a work of art exist autonomously, away from the computer. The art of gestural robotics takes a fresh look at the mechanical. It appreciates the technical in a way that goes beyond the information, analogous to the way film takes on a dimension beyond its 30 frames per second.

Cinema's critical history

Cinema and gestural robotics originate in technology. Some of the first writings on cinema dealt with its technical features.[2] Curiously, many early writers on cinema, in their fervor to make cinema an art, downplayed the mechanics of the apparatus by limiting their comments to general discussions (see works by Antonin Artaud, Ricciotto Canudo, Vachel Lindsay, Dorothy Richardson, and Virginia Woolf, among others). As with earlier art forms, disagreements focused on cinema's fundamental goal. Should cinema record reality, portray fantasy, reveal memory, or act in some combined capacity? These writers struggled to carve out an important place for cinema through codification of its artistic essence, pitting realistic film against deliberate constructions of fantasy. They contrasted cinema with more established art forms, explored it through psychology, and even compared it to hieroglyphics in an attempt to understand its power.

In all these explorations, one of the most important conclusions was that cinema was magical, in a way that was hard to completely quantify. Cinema has the power to focus on a detail in the way that our eyes can't or won't. Its close-up takes away the limitations of being stuck at a certain focal point in real time. Hugo Munsterberg, prefiguring more contemporary psychological discussions on cinema, argued in 1916 that it is exactly this ability to frame that gives cinema its power.[3] Yet what Munsterberg ultimately pinpoints as the power of film is its ability to enter the space inside our head. Even today much remains unknown about the way our brains function—there's a gap between what we think and what is real. Similarly, it's this element of mystery that makes cinema so powerful and palatable.

Cinematic audiences watch moving images from a passive, seated position in a dark room. Recent advances in sensor technology and software make moving, interactive images a reality. While interactive cinema lets the viewer play the image, the illusion of being part of or inside the work disappears.

Toni Dove's *Artificial Changelings* (1998) is an excellent example of interactive cinema. *Artificial*

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Changelings has two protagonists: a Victorian kleptomaniac and a futuristic hacker. The work's synopsis explains that it's "a unique statement on how consumer economy, from the Industrial Revolution to the present, shapes identity" (see http://www.funnygarbage.com/dove/overview.html). Viewers move in four different zones that are progressively closer to the front of the screen to change what's happening in the work, both temporally and spatially. The different zones, as well as their gestures, shape the work's progression.

Technically, the piece uses the real-time interactive programming environment MAX/MSP; NATO, an object that controls video in MAX/MSP; and David Rokeby's softVNS, a motion tracking system, to sense the viewers' movements and alter the progression of images and sounds. However, because of the setup's complexity and the wealth of material contained in the 40 minutes of images, the piece requires a learning curve in order to interact with it. The experience largely becomes about learning the interface and mastering and controlling it, which delays viewer gratification.

Arguably, conventional cinema is already interactive because viewers must complete the experience with the connections they make in their heads. In interactive cinema, the mystery and magic takes a back seat to the technology.

Much work produced under the rubric of new media is caught up in technology; artists struggle to make interfaces and tools their own. Any artist using a new technology or new material must get beyond the medium to express the message. Not surprisingly, artistic practice using cutting-edge technology is often criticized for not being fully formed. For example, work made using animation packages or programs such as Adobe Photoshop—because the programs are designed to meet a wide variety of needs—often retains the stamp of the interface on it. In contrast, the technology artists use in gestural robotics pieces succeeds because it's custom-made and it harnesses a full range of expression.

Toward robotics

In his book *Robots: The Living Quest for Machines*, Geoff Simon quotes cybernetician Jasia Reichardt, "It is as if behavior were more important than appearance in making us feel that something is alive."[4] This is the main idea, married with the specific appearance designed by the artist, behind gestural robotics. The following small selection of works by no means provides a complete picture of the many ways artists can successfully use robotic tools. However, these examples illustrate that they use machines to elicit emotions.

Sabrina Raaf shaped *Breath I: Pleasure 2000* using a creative hodgepodge of materials: Mr. Bubbles, printer's ink, a cow gut, neon, Plexiglas, bee's wax, aluminum, and electronic circuitry. These elements form 12 luminous circles mounted on the wall in a constellation-like pattern and are connected together by gently looping wires (see Figure 1a). Each circle contains the red outlines of bubble-like cells overlaid by a shimmering white vein structure (see Figure 1b). *Breath I: Pleasure 2000* uses three microcontroller circuits to randomly retrieve 21 breathing patterns. The light within the circles changes its intensity according to the breathing pattern in progress, glowing with variable fragility. While the piece is the mechanization of one of the most basic human functions, breathing, its visual effect gently suggests actual breathing. This distance allows viewers a chance to introspectively experience Raaf's, as well as their own, breathing and interpretations of breathing (see http://www.raaf.org/).

Heidi Kumao's *Protest* (*Girl on Stage*) *2000–2001* is part of her Emotional Machines series. The work is still in progress, but currently, it connects a girl's

Figure 1. **Breath I: Pleasure 2000.** ***(a) Raaf's fragile glowing breath vibrates. (b) Close-up detail of*** **Breath I: Pleasure 2000.**

Figure 2. **Protest (Girl on Stage) 2000–2001.** ***The pared-down shoe foregrounds Kumao's gesture.***

shoe, placed on top of a box on the floor, to an aluminum leg and a box containing a motor on the wall (see Figure 2). When Kumao completes the piece, it will have several variations, including a stomping girl (where she will mount the leg to the floor and have it kick upward) and a nervous leg that will shake. Both will respond to the viewers' presence. Each of the variations will have a sensor that responds to the viewer's presence, thereby implicating viewers in the piece's motion (or emotion).

By stripping the shoe bare and reducing the leg to a metal implement, Kumao lets the gesture and the repetition take center stage. Throughout Kumao's work, she deals with the loaded psychology and power dynamics within personal spaces. In her earlier pieces, she explored these issues with zoetrope-like machines. Kumao's newer work explores the same issues through the use of robotics. She retains her interest in confined structures and repetition, providing a clear model of artists harnessing cinematic apparatuses and simple robotics toward to same ends (see http://home.earthlink.net/~bearqueen/machines.html).

Louis-Phillipe Demers and Bill Vorn's *The Convulsive Machine* is part of an elaborate six-table installation: *La Cour des Miracles* (*The Court of Miracles*). In the installation, Demers and Vorn create a machine environment where the machines, because of their behaviors, address issues of empathy and anthropomorphism (see Figure 3). In *The Convulsive Machine*, the spindly metal structure shakes, and its unpredictable movements are heightened in the viewers' presence. Thus, viewers both watch and control the machine's "pain." Their actions affect the machine; they hold a position of power. Ironically, because machines don't feel, the viewers' identification is a result of their understanding of living pain. The fact that the machine's motion is simple and repetitive, yet altered by the viewers' presence, encourages a simple identification (see http://www.billvorn.com).

Jean-Pierre Gauthier's *Le Grand Ménage* is a series of four small rooms where the viewers' and staff's presence triggers cleaning rituals that, left to their own devices, overflow, disintegrate, and mark the spaces in unique ways (see Figure 4). By focusing on these relatively small moments and movements within the installation's context, the artist explores elements of time, issues of presence and absence, and the breakdown of boundaries. Gauthier's piece is filled with obsessive, repetitive gestures, and it foregrounds the chaos and mess the cleaning produces.

In each room, ordinary household objects take on a living quality, in marked contrast to their usual roles as objects in an order-producing ritual. A sink spurts liquid bubble bath into the air in the janitor's room while a nearby mop produces its own bubbles. The shower room contains several showers with buckets hung on the wall that shake, producing the sounds of water hitting metal. A table and chair rattle in the break room while a bottle spits out thick liquid dish soap, foaming and accumulating on the floor. The men's toilet contains several objects molded from soap including a garbage con-

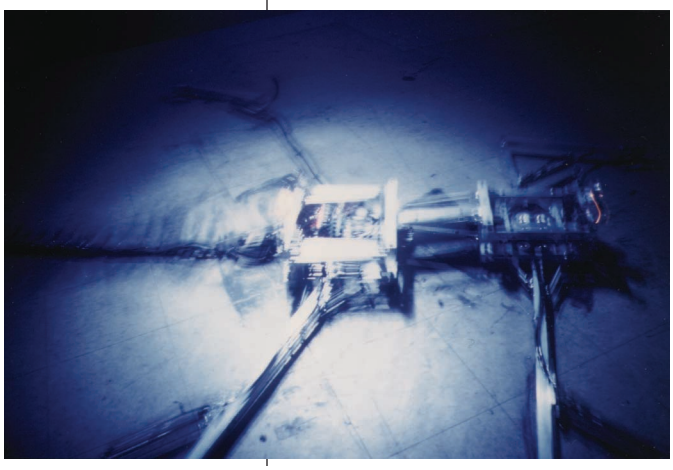

Figure 3. The **Convulsive Machine.** ***Demers and Vorn's convulsing pile of metal incites viewer empathy.***

Figure 4. Household objects come alive in **Le Grand Ménage.** ***(This installation, by artist Jean-Pierre Gauthier, was photographed by Guy L'Heureux.)***

tainer on wheels and cleaning product bottles. Automatic water sprayers hit the soap objects, which disintegrate over time. Meanwhile, a motorized mop cleans the floor and a toilet brush scrubs out one of the urinals. Each of these events contains their own small narratives that repeat and transform. While the viewer influences the items' actions by activating the sensors throughout the installation, their resultant behaviors create a kind of self-sufficienct life, paralleling our own but also remaining separate (see http://www.ciac.ca/biennale2000/en/visuels-artistes-gauthier.htm).

When we look around, we want to recognize and understand what we see. However, we can't underestimate the role of imagination in completing this process. Simon Penny, a robotic artist and theorist asks, "Why do we want our machines to seem alive?"[5] In answer to Penny's question, our machines seem alive because we bring them to life. **MM**

Acknowledgment

Figure 4 was first published on the CIAC (The Museum of Contemporary Art of Montreal) Web site for La Biennale de Montréal 2000 (http://www.ciac.ca/biennale2000).

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Readers may contact Skogerson at the Rensselaer Polytechnic Inst., Arts Dept.-DCC 135, Troy, NY 12180, email skogee@rpi.edu.

Contact Artful Media editor Dorée Duncan Seligmann at Avaya Labs, Room 2B-315, 600-700 Murray Hill, NJ 07974-0636, email doree@avaya.com.