

**HAPTIC CINEMA:
AN ART PRACTICE ON THE
INTERACTIVE DIGITAL MEDIA TABLETOP**

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HAPTIC CINEMA:
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INTERACTIVE DIGITAL MEDIA TABLETOP

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To my mother, LADYI, and my husband, TIM.

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SUMMARY

Common thought about cinema calls to mind an audience seated in a darkened theatre watching projected moving images that unfold a narrative onto a single screen. Cinema is much more than this. There is a significant history of artists experimenting with the moving image outside of its familiar setting in a movie theatre. These investigations are often referred to as "expanded cinema".

This dissertation proposes a genre of expanded cinema called *haptic cinema*, an approach to interactive narrative that emphasizes material object sensing, identification and management; viewer's interaction with material objects; multisequential narrative; and the presentation of visual and audio information through multiple displays to create a sensorially rich experience for viewers. The interactive digital media tabletop is identified as one platform on which to develop haptic cinema. This platform supports a subgenre of haptic cinema called *tabletop cinema*.

Expanded cinema practices are analyzed for their contributions to haptic cinema. Based on this theoretical and artistic research, the thesis claims that haptic cinema contributes to the historical development of expanded cinema and interactive cinema practices. I have identified the core properties of a haptic cinema practice during the process of designing, developing and testing a series of haptic cinema projects. These projects build on and make use of methods and conventions from tangible interfaces, tangible narratives and tabletop computing.

CHAPTER 1

INTRODUCTION

Cinema's history is variegated. From the early days of its roots in spectacle, the circus and theater, to its contemporary electronic and algorithmic forms, it continues to expand, supporting our new inquiries into how best to reflect our understanding of the world. Common thought about cinema calls to mind audiences seated in a darkened theatre watching Hollywood produced films unfold on a single screen. In the narrative, there is a protagonist with a problem who takes us on an adventure that is situated in the tension between desire and danger. At the end of the journey, there is a clear resolution.

Cinema is much more than this. There is a significant history of artists experimenting with the moving image outside of its familiar setting in a movie theatre. These investigations have been called by many names: *avant-garde cinema*, *experimental filmmaking*, and *alternative cinema*, to name just a few. These terms were generally applied to filmmakers working with celluloid. When the first consumer portable video camera was introduced, experiments with this technology soon ushered in the name *video art*. Once video could interface with a computer the terms *interactive cinema* and *database cinema* were introduced as names for experimenting with the moving image.

Although film and video artists initially divided themselves into separate camps, they were equally concerned with experiments that challenged industrialized presentations of the moving image by rethinking the representation of time, space, display and narrative. In this way, they were working under the broader category of

cinema. In the article *Cinema and the Code* (1989), Gene Youngblood identified cinema as being able to exist across physical media.

Considering all of the media that we use to produce cinema, the fact that an image moves across a surface remains unchanged. How this happens depends on the medium, which informs our understanding of cinema. Regardless of whether the medium used by artists to investigate the moving image is film, video or the computer, I identify them as "expanded cinema".¹

My history with the moving image spans traditional and experimental approaches to cinema.² More recently, I have constructed narratives that use the moving image with other art forms such as theatre and sculptural forms. One such narrative is, *Flying Over Purgatory*, which was written as a screenplay (1996) and later adapted to a multimedia stage play (2002). It is a memory piece set in Philadelphia in the Civil Rights era of the 1960s when John F. Kennedy was president, and in post-Apartheid South Africa in the 1990s during Nelson Mandela's presidency. There is a cast of characters across two continents, including a ghost, and several languages are spoken. As a stage play, the multilayered story is more effectively conveyed and absorbed by an audience. The stage play incorporates rear screen projection for memory scenes allowing for the illusion of onstage characters interacting with projected images. The projection is also used for translating various South African languages into English. To achieve the effect of an actor interacting with a projected image, I used a *Wizard of Oz* approach. Backstage, a

¹ The term "expanded cinema" was coined in the 1960s by filmmaker Stan VanDerBeek and made by popular by Gene Youngblood in his book *Expanded Cinema* (1970). In his book, Youngblood connects expanded cinema to expanded consciousness.

² A partial filmography is available at <http://movies.nytimes.com/person/189075/Ayoka-Chenzira/filmography>

production assistant operated the first version of the iMac and a projector. The assistant would manually click on QuickTime movies to play through the projector at the appropriate time. To avoid the projector's light being shown when the assistant was setting up a movie for playback, a small piece of black board was used to block the light. This manual approach piqued my interest in what might be possible regarding human-computer interactions.



Figure 1.1 Multimedia stage play, *Flying Over Purgatory* (2001), by Ayoka Chenzira

It is challenging to identify a single path that leads to a sole definition for expanded cinema. Many of the seminal American filmmakers whose work is defined as expanded cinema were European immigrants initially trained in painting, photography, sculpture or dance. They brought to their investigations with the moving image aesthetics and theoretical frameworks from these disciplines. Although not often credited in historical writings, the ancestral line to what would become the preoccupations of computer-based

interactive art can be traced to many of the experiments by filmmakers and video artists in the 1960s and 1970s. These works were preoccupied with expanding cinema, as I will discuss in chapter two.

The concept of expanded cinema began as part of a larger cultural movement of expanding art. This 1960s preoccupation by artists was centered in the questioning and overturning of art practices and theories that emerged under modernism, which focused on the formal properties of a medium, often to the point of abstraction. The resulting movement, termed postmodernism, emphasized subjectivity, personal expression, non-hierarchical classifications of art, and the rejection of art as the rejection of art as a commodity.



Figure 1.2: *Fool's House* (1962) by Jasper Johns

A sculpture could be horizontal, as it was when Carl Andre used one hundred and twenty bricks for his work *Equivalent VIII* (1966). A non-narrative approach to dance using non-dancers in ordinary street clothes and performing pedestrian movements became the foundation for dance choreography such as *We Shall Run* (1963) by Yvonne Rainer.



Figure 1.3: Still image of Yvonne Rainer from book *Feelings Are Facts: The Life of Yvonne Rainer* (in production) by Jack Walsh.

At the helm of expanded arts was the concept of *Fluxus*, which means to flow and change. Artist George Maciunas applied the name as a conceptual framework. The works of international artists who worked under the “rear-garde” Fluxus umbrella were often described as fluid, spontaneous, and random. Composer John Cage was influential in the development of Fluxus, particularly in the United States. His use of the *I Ching*, a Chinese text that describes how order exists in seemingly random or chance events, formed the basis of his approach to music. The principal ideas behind Fluxus were to dismantle “high art” as seen in museums and galleries by proving that anything could be art;³ that anyone could be an artist; and to remove barriers between artistic disciplines. What emerged was the notion of intermedial art, a way of mixing together different artistic media to explore what happens when they interconnect.

The expanded arts movement influenced filmmaking through material experiments that produced what I think of as “tangible films,” where a human mark was imprinted. Everything imaginable was attempted to imprint to celluloid material, including scratching and hand coloring, hole punching, and spray painting. The basic elements of cinema (camera, celluloid, projector, screen, lamp, theatre) were often disassembled, rearranged and reassembled to reflect expanded versions of cinema. The goal was often to activate watching. As described on the website for the Tate Modern:

Expanded Cinema identifies a film and video practice which activates the live context of watching, transforming cinema's historical and cultural 'architectures of reception' into sites of cinematic experience that are heterogeneous, performative and non-determined.

³ Fluxus was influenced by the earlier work of Marcel Duchamp who is known for the concept of the “readymades” where found objects were presented as art.

The accessibility of video in the late 1970s and early 1980s produced one of the most striking features of postmodern art, the deconstruction of the dominant voices of authority and their cultural and political institutions by a broader range of communities. Artists who were once marginalized because of their race, gender, sexual orientation or nationality argued that content is as important as form. In the introduction of the book, *Women and Experimental Filmmaking* (2005), Jean Petrolle and Virginia Wright

Wexman write:

Women's experimental film practices often challenge masculinist avant-garde aesthetic dogmas by juxtaposing narrativity and non-narrativity, deploying narrative pleasure alongside narrative disruption, providing viewers with identification as well as critical distance, and so on.



**Figure 1.4: *Tap and Touch Cinema* (1968)
by Valie EXPORT**

As artists were rethinking and expanding on previous traditions, art disciplines were converging and becoming less medium specific. Much of the convergence was centered

in the use of video as the primary recorder of the moving image, and its relationship to a computer as a way to spatialize, construct and navigate through a digital environment. Expanded cinema then includes experiments with analogue film, electronic video, and the computer. Haptic cinema positions itself within the tradition of expanded cinema.

In the field of human computer interaction (HCI), "haptic" relates to tactile devices that either allow for the manipulation of virtual objects or provide force-feedback, for example, in the form of a vibration. Outside of HCI, artists and scholars from many disciplines consider the notion of "the haptic" as a conceptual framework to theorize about embodiment and the senses. Graphic designer and curator for the Nippon Design Museum, Kenya Hara, organized the exhibition HAPTIC Awakening the Senses (2004) in Japan. In an online article titled Fruitful Design he commented, "The ancient term haptic refers narrowly to the sense of touch, but I prefer to use it in a broader sense as something that on sight awakens all the senses."

Experimental filmmaker and performance artist Valie EXPORT created a paracinema⁴ work that is also highly conceptual form of haptic cinema when she brought together the cinema and touch in her *Tap and Touch Cinema* (1968). For this work, EXPORT strapped a cardboard box that was constructed like a movie theatre around her torso. The doors of the theatre were open and she invited people to visit the "cinema" for five minutes. Her torso was the screen while the "film" played in the viewers' imaginations as they touched her.

⁴ Cinema that does not use the cinematic apparatus.

During the time that I directed *Flying Over Purgatory*, I determined that several of my recent screenplays would benefit from approaches outside of a traditional film presentation. During this time, I was given a book by Janet Murray titled *Hamlet on the Holodeck: the Future of Narrative in Cyberspace* (1997). Murray explores the future of storytelling through hypertext fiction, interactive cinema, autonomous agents and more. Through this work, my imagination expanded. I understood why I had outgrown traditional forms of narrative presentation and what new forms awaited me. The search for structures to support my work has led to this dissertation on haptic cinema, a form of expanded cinema. More recently, media theorist Laura Marks, through her book, *The Skin of the Film* (2000), inspired my concept of haptic cinema. She describes cinema as multisensory, particularly awakening our sense of touch through haptic visuality. In haptic visuality, images are presented in a way that stimulates our eyes' desire to "brush" up against or touch it on the screen.

Rather than making the object fully available to view, haptic visuality puts the object into question, calling on the viewer to engage in its imaginative construction. Haptic images pull the viewer close, too close to see properly" (1999, p. 16).

What is particularly influential to my argument for haptic cinema is Marks' analysis of the value of material objects in constructing histories. These objects "can encode knowledge that becomes buried in the process of temporal or geographic displacement but are volatile when reactivated by memory"(2000, 85). In chapter 3, Marks' analysis of material objects will be further examined.

1.1 Thesis Statement

There is a significant history of artists experimenting with the moving image outside of its familiar setting in a movie theatre. These investigations are often referred to as "expanded cinema", an approach to cinema that emphasizes an active relationship between the viewer and the moving image. I propose a genre of expanded cinema called *haptic cinema*, an approach to interactive narrative that emphasizes the viewer-screen relationship through viewers' interaction with material objects that connect to audiovisual information that is presented through multiple displays. One platform on which to develop haptic cinema is the interactive digital media tabletop. This platform supports a subgenre called *tabletop cinema*. As demonstrated in the following chapters, haptic cinema is situated within the historical practice of expanded cinema and interactive cinema. During the process of designing, developing and testing a series of haptic cinema projects, I have identified the following core properties of a haptic cinema practice:

1. Haptic cinema is a genre that expands cinema through the interlocking of cinematic conventions, digitally navigable environments, viewer interaction with material objects, and multiple displays.
2. Haptic cinema uses material object to navigate through a digital environment. The material objects used embody knowledge that is transferred to multiple displays where it is revealed.
3. Haptic cinema uses sensing technologies for object tracking.

4. Haptic cinema uses multiple displays to create an active relationship between the viewer and the audiovisual information. Multiple displays also support layered meaning through image association.

Additionally, haptic cinema builds on and makes use of methods and conventions from tangible interfaces, tangible narratives and tabletop computing.

1.2 Thesis Contributions

Five specific contributions are made.

1. Identification of haptic cinema as a genre

The findings contribute to the art of the moving image by identifying a new genre of moving image practice called haptic cinema, which expands cinema and contributes to the field of interactive narrative.

2. Identification of the historical line in which haptic cinema is situated

Haptic cinema is identified as part of a history of practices that experiment with the cinematic apparatus to explore an active relationship between the viewer and the displayed audiovisual information.

3. Identified the interactive digital media table as a platform for expanding cinema.

This dissertation is the first document to identify the interactive digital media tabletop as a platform for expanding cinema.

4. Identification of the relationship between material objects and embodied knowledge as a conceptual approach to moving image construction.

Haptic cinema considers material objects as threshold objects that embody knowledge and permit access to a navigable digital environment. This concept is useful for moving image construction and creates a richer connection to the overall haptic cinema experience.

5. Using the tabletop in concert with multiple displays

Published research shows that most designers for the tabletop use one display to show images on to the surface of tabletop. In this dissertation, I demonstrate how to use the tabletop with multiple displays to show images outside of the surface of the tabletop.

1.3 Thesis Overview

The following chapters consider the conceptual, aesthetic, and theoretical foundations underlying the development of haptic cinema.

Chapter 2, EXPANDED CINEMA, presents expanded cinema practices in the 1960s, 1970s and 1980s that used analog film and electronic video. The experiments explored materiality, developed video as an art form, and made use of multiple displays. As such, they anticipate haptic cinema.

Chapter 3, INTERACTIVE CINEMA, continues to establish a basis for haptic cinema by considering how cinema has been expanded through the temporal and spatial constructions developed in a digital environment and interactivity.

Chapter 4, HAPTIC CINEMA identifies and analyzes theories that underlie the construction of haptic cinema. In particular, the theorizing of *haptic* as a conceptual framework that also includes material objects.

Chapter 5, ARTWORK EXPLORATIONS, presents the design, implementation and evaluation of five haptic cinema experiments.

The final chapter concludes this dissertation by reflecting on the lessons learned and offering a vision of future directions for haptic cinema.

CHAPTER 2

EXPANDED CINEMA: ANALOG AND ELECTRONIC INTERPRETATIONS

In developing haptic cinema, I consider past artistic approaches to the moving image that investigate cinema as an object; reconsider the relationship between the viewer, the moving image and the screen; and use the cinematic apparatus to critique representation. For haptic cinema, these areas form an interlocking relationship that is rooted in the expanded cinema practices of the 1960s, 1970s and 1980s. Although expanded cinema practices continue today, and current work offers more technical sophistication, its ideological and aesthetic roots are in the experiments of an earlier generation. As haptic cinema is in its nascent stage, I am interested in those strategies that were developed and nurtured prior to their use as a springboard for subsequent inquiries. There are three primary categories in this chapter: *material experiment with film*, *video art* and the *art of moving image display*.

2.1 Material Experiments with Film (1960s and 1970s)

In the industrialized form of cinema, celluloid is treated as precious. It must be handled with care, and in its unprocessed state cannot be exposed to light. These are conditions set to avoid damage that includes scratches, tears, dust collection, and breaks in the sprocket holes. These constraints for traditional filmmakers, however, present themselves as opportunities to filmmakers who want to explore their concepts through materiality. In their handling of the celluloid, cinema becomes a tangible object and a haptic experience. This reflexive view of cinema has inspired many types of experiments

that have resulted in presentations of the moving image different from those commonly offered by industrialized practices. These material experiments produced what I think of as handmade films, using a tangible approach to filmmaking in which a human mark was imprinted. It is an early form of haptic cinema, where everything imaginable that could be done to imprint the celluloid material was attempted, including scratching, hand coloring, hole punching, and spray painting. For some artists, cinema could have a photo-chemically produced image or even an image created without a camera. Filmmaker Stan Brackage was known for exploring perception in his handmade silent films. In the three-minute film, *Mothlight* (1963), he rethought the definition of cinema by creating a work that was not dependent on the use of a camera.



Figure 2.1: Brackage's hands constructing the film *Mothlight* (1963).

The film was made by pressing together a hundred moth wings, leaves, and other materials in between celluloid strips to make an optically printed film that emphasized a relationship between nature (physical material) and the mechanical projector.



Figure 2.2: Still image from film *Mothlight* (1963) by Stan Brackage

Artist Nam June Paik created *Zen for Film* (1964) using the ends of an hour-long strip of clear celluloid joined and then run through a film projector as an unending loop for as long as the motor ran. The light from the projection lamp was displayed through the projection lens and a bright frame was projected on a white wall. Because the leader continuously moved through the projector, it was eventually scratched and gathered dust, thereby making the work generative and a precursor to what would eventually emerge when artists incorporated the computer into their work. The loop would reveal itself again in the early 1980s with the videodisk and then again in the 1990s when it became an option in QuickTime, Apple's proprietary multimedia platform. Paik's use of the loop

in *Zen for Life* is as a metaphor with intended sarcasm for our passive watching of film and television.

Carollee Schneemann is a visual artist known for her work involving the female body and sexuality. This preoccupation was centered in her observation that women know very little about their bodies. Originally trained as a painter, in 1967 Schneemann created the film *Fuses*, which showed her and a man engaged in sex in a variety of positions. Over these images, she superimposed filmed scenes from nature. She further treated the film by drawing, staining, and burning the celluloid.



Figure 2.3: Still image from the film *Fuses* (1967) by Carollee Schneemann

Her goal was to discover the distinction between pornography and a woman's self-representation of her sexual engagement.⁵ The result is a comment on the artist's subjectivity and sexuality.

In each of the examples, artists explore a concept by handling the materiality. In their handling of the celluloid, they also explore the construction of cinema without depending on its most basic feature, the frame. The frame is the smallest unit in a film. It is a core part of film language and is relied on to build a scene. It establishes the beginning and the end of a shot, an uninterrupted piece of film, and is used to decide where to make a cut in the film, which can then be spliced onto another series of frames. Filmmakers control the timing of a shot by controlling the number of frames. For example the illusion of moving images is created by projecting still images captured on celluloid and projected at a rate of 24 frames per second.

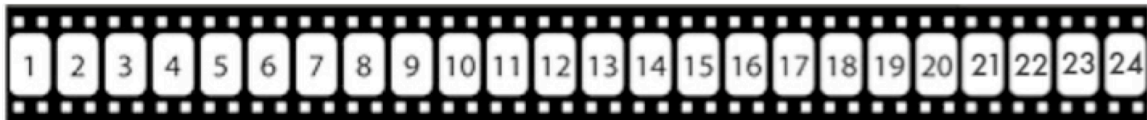


Figure 2.4: 24 frames of film equals one second of motion

What happens when the frame is ignored as it is in *Mothlight*, *Zen for Life* and *Fuses*?

In my constructed example of *Mothlight*, shown in Figure 2.5, Brackage ignored the frame when he randomly pressed materials in between the celluloid. The result is that

⁵ NSRC staff (2005-03-22). "Hear Her Roar: Carolee Schneemann transforms art and discourse on the body, sexuality, and gender". *American Sexuality*. National Sexuality Resource Center. <http://nsrc.sfsu.edu/MagArticle.cfm?Article=411&PageID=0>.

damaging effect becomes part of a generative narrative. Curator Ken Kelman notes in the Canyon Cinema Catalogue:

Mothlight is a paradoxical preservation of pieces of dead moths in the eternal medium of light (which is life and draws the moth to death); so it flutters through its very disintegration.

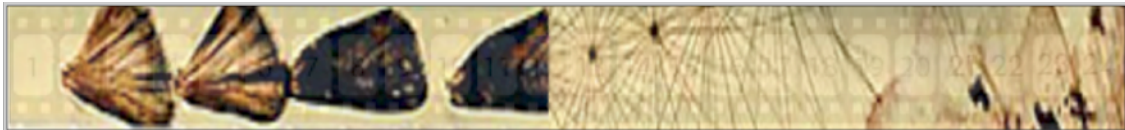


Figure 2.5: *Mothlight's* disregard for the film frame (author's interpretation).



Figure 2.6: *Fuses* ignoring the frame (author's interpretation).

In Paik's *Zen for Life*, the dust and scratches randomly collect across the frames. Like *Mothlight*, it is a generative process. Schneemann's *Fuses* shown in figure 2.6, retains the frames in her filmed images, but then they are ignored when the artist draws, paints and burns across them.

The result of the manipulation of the material and the dismissal of the frame is that *Mothlight*, *Zen for Life* and *Fuses* consider cinema as an object, which through their investigations becomes poetic. In the case of *Mothlight* and *Zen for Life*. Their random and generative qualities will be celebrated by the next generation of artists when computers become partners in creating work. Through their investigations, the artists mentioned contributed to haptic cinema by exploring a haptic approach to cinema through their use of physical materials that indicate cinema itself as an object. Additionally, by ignoring the frame, they establish a context for how to move imagery in

and out of a boundary frame when using the interactive digital media tabletop to create haptic cinema.

2.2 Video Art: Electronic Interpretations (1970s and 1980s)

It may seem unusual to include electronic video in a survey of expanded cinema.⁶ Video's history from the 1970s to the early 1990s is such that video artists made great efforts to separate themselves from filmmakers working in celluloid. Although there were some similarities in production techniques, experimental filmmakers working with celluloid inherited a long and complicated theoretical discourse and complex layers of film history, which video artists generally wanted to ignore. Initially, the newness of the medium allowed these artists to create their own communities. Later, in the 1990s, when production and exhibition equipment became digital, the separation between film and video artists would be erased. However, beginning in the 1970s, the line of demarcation between film and video makers was clearly drawn. The easy-to-use video camera with its grainy black and white imagery was an affront to many classically trained and experimental filmmakers, myself included. Video artists, rebuffed by the elitist attitude of filmmakers, carved out their own separate territory, which turned out to be quite complex. In the anthology, *Illuminating Video: An Essential Guide to Video Art* (1990), editors Doug Hall and Sally Jo Fifer write:

Video's pedigree is anything but pure. Conceived from a promiscuous mix of disciplines in the great optimism of post World War II culture, its stock of early practitioners includes a jumble of musicians, poets, documentarians, sculptors,

⁶ Gene Youngblood does so in his seminal book, *Expanded Cinema*.

painters, dancers, and technology freaks. Its lineage can be traced to discourses of art, science, linguistics, technology, mass media and politics. Cutting across such diverse fields, early video displays a broad range of concerns, often linked by nothing more than the tools themselves (1990, 14).

2.2.1 The Portapak

Introduced commercially by Sony in 1967, the Portapak was the first portable video camera marketed to the public.



Figure 2.7: Woman holding two-component Portapak.

Prior to its release, mobile image recording was produced on celluloid designed for nonprofessional recording (16mm, super8 or 8mm). It consisted of a camera that recorded black and white images onto a record-only helical 1/2" VCR (similar to a reel-to-reel tape recorder). For playback, one needed a separate VTR. This was the first time

that an electronic version of the moving image could be displayed instantly outside of a broadcast studio. The Portapak could also be connected to a household television or to multiple monitors. Obtaining a viewable image using celluloid requires an understanding of how the various parts of a film camera, lenses, and film stock work together to produce different types of imagery (grainy, high contrast, blurry, muted, etc). With the Portapak, one could simply pick up a camera, remove the lens cap, push a button to turn the camera on, and push another button to record. In 1969, videotape was added, allowing the moving image to be recorded and stored. In 1971, new interactive features were added, and for the first time artists could playback, rewind, fast forward, and pause images. By the early 1980s, the two-component Portapak system was combined into a single unit known as a camcorder. Once frame-accurate editing appeared, looping became a staple in productions. The Portapak and subsequently the camcorder forever changed how artists would consider the moving image. It provided artists unprecedented opportunities to experiment with the moving image. They represent decentralized media with one person capable of being the equivalent to a television studio producing disseminating their videotapes.

2.2.2 Video as a Medium

Although video by way of the Portapak entered the consumer market during the time of late modernism where medium specific arguments were waning, the early preoccupation with the tool is understandable. There had never been anything like a video camera available to artists. Emerging video artists did what most artists working with a new medium do. They sought to identify and emphasize the properties of the new

medium that would distinguish it (and themselves) from film. However, unlike film, where the intrinsic properties were easily identifiable, video's properties were less apparent. The traditional film process creates an illusion of movement by projecting still images captured on celluloid through a projector at 24 frames per second (in the U.S. system). The material still image can be imprinted on the celluloid, which is visible to the naked eye. It is therefore, human-readable and controllable. In video, a time-based medium, there is never a still image; there is the illusion of stillness since the image builds itself through an ever-moving scanning process. Early video using the Portapak was based on electronic materialism. There was no physical material to hold or apply other materials, as with celluloid.

Artists and scholars wrestled with the idea of video's properties. In the anthology *Illuminating Video*, there are several points of view regarding video's defining properties. Hill and Fifer put forward a list of video's properties, noting those properties, which they identified as its grammar – its way of speaking.

...a glowing surface that is composed of bits of information on a (relatively) small phosphorous screen; a source of light to look into; a light emanating from a machine called a television; instantaneous transmission; an instancy that instills in the viewer an illusion of immediacy; and a temporality that is both informed by and a reaction against TV's use of time (1990, 23).

Conversely, scholar Marita Sturken argued that limiting the discussion to a medium's distinct properties was shortsighted.

It points to a tendency to believe that machines dictate aesthetic development and a deep-set cultural belief that people do not really control machines but are always on some level controlled by them (1990, 115).

In a letter to Sturken written in 1987, artist Rita Myers reaffirmed Sturken's position.

While I did attempt to locate its "inherent properties" like a good modernist, these properties are inextricably linked to subject matter, a natural consequence of the camera but also a radical shift away from the other modernist media, painting, sculpture, etc. You can't really reduce a medium to its constituent elements when one of those elements virtually gives you the world back. Video challenged the modernist creed with content and it continues to challenge the traditional museum/gallery world with moving parts and time, among other things (1990, 119).

Media artist and cultural critic Christine Tamblyn argued that a distinct property of video could be its lack of specific properties and its ability to be boundless.

Omnivorously or even cannibalistically, the video medium seems to be capable of accommodating any synthetic aesthetic strategy production method, or format that artists have managed to devise (1990, 405).

Art critic Rosalind Krauss considered video as a psychological medium. In her analysis, the body and the psyche serve as conduits between the camera and the recorded images.

In her essay, *Video: The Aesthetic of Narcissism* (1978), she writes,

Unlike the other visual arts, video is capable of recording and transmitting at the same time, producing instant feedback. The body is therefore as it were centered between two machines that are the opening and closing of a parenthesis. The first of these is the camera; the second is the monitor, which re-projects the performer's image with the immediacy of a mirror (1978, 52).

Emerging video artists were often formally trained in other arts disciplines, but were self-trained in video. Their explorations of the medium were frequently viewed as exploring its properties, but more often, they stood for a larger discourse around art. One

question raised was how to leave a human mark in an electronic medium. Based on their experiments of this period, artists addressed this question by:

1. Considering the moving image as an object.
2. Restructuring temporal and spatial relationships.
3. Implying Interaction
4. Critiquing representation

Considering the Moving Image as an Object

With the advent of video, the moving image becomes an object that can be easily manipulated. Sections of an image can be cut out, pasted next to or on top of other images, multiplied, and resized, for example. One could also manipulate the entire picture. In *McLuhan Caged* (1967), Nam June Paik produced a tape of Marshall McLuhan and manipulated the images to the point of distortion by moving magnets across the cathode ray tube. This action prefigured interactivity with moving images beyond the turning of a television knob to change channels or moving the antennae to produce clearer pictures.



Figure 2.8: *McLuhan Caged* (1967) by Nam June Paik).

In the video *Vertical Roll* (1972), the artist Joan Jonas undermines the commercially desired stability of the moving image by desynchronizing the signal between the camera and the monitor. In so doing, she immerses the audience by exposing the medium and interrupting its psychological hold (as articulated by Krauss) while producing a self-portrait

Using an interrupted electronic signal -- or "vertical roll" -- as a dynamic formal device, she dislocates space, re-framing and fracturing the image. The relentless vertical roll, which repeats throughout the tape, disrupts the image by exposing the medium's materiality.⁷



Figure 2.9: *Vertical Roll* (1972) by Joan Jonas.

⁷ "Joan Jonas - Vertical Roll (1972)." *ART TORRENTS*. Web. 18 Sept. 2011. <<http://arttorrents.blogspot.com/2008/01/joan-jonas-vertical-roll-1972.html>>.

Restructuring Temporal and Spatial relationships

Artists created the illusion of having control over time using the rewind, fast forward, looping, morphing, slow motion, speeding, freezing, and spatial montage for example. A seminal work in spatio-temporal experiments is Peter Campus' *Three Transitions* (1973) in which the artist uses three short events to show video's ability to create a spatial narrative through visual illusions.

In *Three Transitions*, I was stating something about the implied space in video, changes of time and space presented simultaneously. It looks magical, but it is simple and logical in the video medium.⁸



Figure 2.10: *Three Transitions* (1973) by Peter Campus

In the first event, it appears as though the artist has stabbed himself in the back and yet another version of him climbs through the rip in his body and becomes whole on the other side. In the second event, he wipes his face with his hands and appears to erase his face. Underneath, another image of his face appears. In the third event, Campus is

⁸ "TATE ETC. - Europe's Largest Art Magazine." *Tate: British and International Modern and Contemporary Art*. Web. 8 Aug. 2010. <<https://www.tate.org.uk/tateetc/issue14/expansivelens.htm>>.

shown burning his face leaving behind a dark space. These works reverse collage through a process of tearing, erasing, and removing.

Implying Interaction:

In the video, *Undertone* (1973) by Vito Acconci, the viewer is pulled into psychologically interacting with the artist, who appears in the video monitor. Acconci is seated at the end of a table looking directly into the camera. His hands are hidden beneath the table. Looking down into his lap, he begins his monologue by trying to convince himself that there is a woman underneath the table who is massaging his thighs. Then, he changes his mind and says that he is rubbing his own thighs.



Figure 2.11: *Undertone* (1973) by Vito Acconci

This alternating perspective of the presence of someone and no one ends when Acconci looks directly into the camera and asks for our help: "I need you to keep your place there at the head of the table. I need to know I can count on you... " At that moment, we are acknowledged as a voyeur and an accomplice. Then he asks, "I need you to screen out my lies, filter out the lies from the real point of view." When Acconci looks into the camera, he is breaking the fourth wall, the imaginary wall that separates the performer from the viewer. We are no longer allowed to objectively look at him. We become part of his world. By seemingly looking directly at us and asking for our help, we are called on to engage with the work psychologically.

Critiquing Representation

Although it may be difficult for some readers to fathom, just a few years before the release of the Portapak in 1967, it was legal to discriminate against women and disenfranchised communities. In 1963, Congress passed the Equal Pay Act, ending pay disparity based on sex. In 1964, the Civil Rights Act outlawed many forms of discrimination, which included racial segregation. In 1965, the National Voting Rights Act outlawed discrimination in voting practices, particularly as they related to African American communities. Video's relative affordability, its immediacy in capturing and displaying images, and its ability to be anywhere at any time was attractive to women and marginalized communities who were eager to redress the lack of images (especially positive ones) as well as the stereotypical and degrading representations of themselves that appeared in commercial media practices. In their hands, video became a tool for social change with the voice of authority shifting from corporate to personal and grass-roots community driven. They extended its value beyond medium-specific

investigations, using its phenomenology instead to interrogate⁹ race, class, gender, nationality, and their intersectionality. Hall and Fifer write:

Television tends to compress the world into simplified equations in which everything is designated as either similar (dominant) or different (other). In this order, universality is ascribed to the dominant's characteristics whereas qualities that belong to the other are marginalized and objectified. The other does not represent but rather is represented. Thus, a hierarchy is encoded into the iconography and the ideologies of every soap, sitcom and advertisement (1990, 21).

As an artist trained in film and the tradition of beautiful imagery, I reluctantly turned to video to produce a work called *Secret Sounds Screaming: The Sexual Abuse of Children* (1986). The work was inspired by a conversation that I overheard between two doctors who were discussing the case of a preteen African American girl brought to the hospital earlier that day, a victim of sexual assault by her mother's boyfriend. The doctors confirmed to each other that this type of assault was "very common with these people". After reading everything that I could find on the subject of child rape and molestation, I interviewed women who had been sexually assaulted as children, incarcerated pedophiles, protective custody administrators, therapists and law enforcement representatives. What I learned did not support the claim by the doctors. Although the heinous crime cut across race and class, the public perception was that it was confined to the poor and people of color. My approach to the production of *Secret Sounds Screaming*... included the familiar television style of the weekly program *60 Minutes* and its reliance on objective journalism, while taking a clear position. One such

⁹ The use of the word "interrogate" instead of "explore", for example, is important. "Interrogating race" is commonly used in sociology and feminist scholarship. It relates to questioning systems of control.

strategy was to disguise the face of the speaker, even when it was not that of an abuse victim, but that of an actor. In Martha Gever's critique of the work in her chapter *The Feminist Factor: Video and its Relation to Feminism* published in *Illuminating Video*, she observed:

By employing such techniques, she stretches the conventions of realist video documentary to encompass a political analysis of subjective experiences and support a position of political advocacy that the mass media would never allow – one that counsels active resistance to unwanted sexual involvements and refusal of masculine assertions of privilege (1990, 233).

This work further illuminates the statement by Myers referenced earlier, "Video challenged the modernist creed with content."

2.3 The Art of Moving Image Display

In the 1960s, cinema was almost exclusively seen in movie theatres and through television monitors in living rooms. This context was reconsidered by artists of this period, who developed strategies to investigate how and where the moving image could be presented and experienced. Through these investigations, the moving image was freed from its traditional viewing spaces, and the familiar pattern of reception was interrupted. The viewer's eye could be drawn to the floor or to the ceiling. The moving image could now be presented in any place where electricity could reach: through multiple displays and projected onto or within any architectural structure. It could be taken into communities via a truck mounted projection screen where residents had few opportunities to visit a movie theatre or talk with a filmmaker. The moving image as an object was extended when it was displayed through a film projector across multiple screens and through multiple television monitors. It could be transformed as previously described,

and freed spatially. The following examples show how artists explored spatializing their work using multiple displays either through film projection or television monitors.

2.3.1 Film Projection: Multiple Projections

As early as 1926, French director, Abel Gance, created the epic silent film, *Napoléon*. The last reel of the film used a widescreen format called polyvision, created specifically for the film. The process used simultaneous projection of three reels of film projected side by side. This triptych presentation allowed Gance to produce simultaneous action and a visual crosscutting.¹⁰



Figure 2.12: Still image from screening of the film *Napoléon* (1926) by Abel Gance.

A contemporary use of multiple displays is *Christmas on Earth* (1963). This single work by a seventeen-year-old Barbara Rubin is a recording of an orgy. It was exhibited using

¹⁰ Cross-cutting is a film editing technique that creates a relationship between two different sequences of events, which infers simultaneous action.

two projectors with one projector positioned so that its imagery was superimposed over the imagery of the other's. The image of the second projector was smaller, creating a frame-within-a-frame effect. In a nod to the expanded arts tradition of randomness and chance, Rubin wrote in a postscript for the film,

so i spent 3 months chopping the hours of film up
into a basket
and then toss and toss
flip and toss
and one by one
Absently enchantedly Destined to splice it together
and separate on to two different reels
and then project one reel half the size
inside the other reel full screen size
and then i showed it
and someone tells me, 'my what a good editing job that is
indeed!'



Figure 2.13: Still image from *Christmas on Earth* (1963) by Barbara Rubin.

Rubin's unconventional salad-toss editing technique created a layering effect with images on top of images that give parts of the film a painterly look. The layering also allows free association by the viewer, which becomes part of the immersive experience. Writer

Daniel Belasco writes in his online article, *The Vanished Prodigy*, that the notion of randomness also extended to how the film was presented. Rubin sometimes projected the film with one reel being upside down or superimposed over someone else's film.

Multiple displays can be less random and more thoughtful in its intent. Andy Warhol created his *Inner and Outer Space* (1965) split screen film. It is actually a hybrid using both film and video from the first recorded use of a prototype home video camera manufactured by Norelco. In this film, there are frames within frames as actress Edie Sedgwick sits in front of a television monitor that plays a prerecorded image of her. The seated Edie and the television Edie are positioned so that they appear to converse with each other. The display of the work requires precision alignment of two projectors. The film plays on two reels that are projected side-by-side. The effect is the implication that four Edie's occasionally talk to each other.



Figure 2.14: Still image from *Inner and Outer Space* (1965) by Andy Warhol.

Chelsea Girls (1966), a film by Warhol and Paul Morrissey, followed the lives of some of the women who lived in the now famous New York Chelsea Hotel. It used two projectors positioned side-by-side and running asynchronously so that each time the film was viewed, it was experienced differently.



Figure 2.15: Still image from the double projection film, *Chelsea Girls* (1966) by Andy Warhol and Paul Morrissey

In the double projection, split screen presentation, color scenes and black and white scenes are presented simultaneously. Running six hours in length, the dual projection cuts the running time to three hours of layered information. The two projectors used were seldom in synch with each other, creating a different film each time it was viewed. The idea of a different experience at each viewing prefigures interactive computational narratives, where the desired effect is often similar.

Valie EXPORT used triple projections for her film *Adjungierte Dislokationen* (1973). She strapped one camera to her chest and another to her back then freely moved through environments while recording the passing imagery. The captured images were displayed using three projectors, which created a simultaneous presentation of an urban landscape from different points of view.

Strapping a camera to the front and back of her torso, she moved freely through environments while recording the passing imagery. The captured images were displayed using three projectors, which made a simultaneous presentation of an urban landscape from different points of view.



Figure 2.16: Valie EXPORT with a camera strapped to her chest.



Figure 2.17: Valie EXPORT with a camera strapped to her back.



2.18: Still image from *Adjungierte Dislokationen* (1973) by Valie EXPORT

In Annabel Nicolson's performance with a sewing machine and projection titled *Reel Time* (1973), she explored the film apparatus while creating a self-portrait. After seeing

the performance, *Helge Krarup* described the work, which is republished on the Luxonline online site:

in the middle of the room she sat at a sewing machine, annabel nicolson. onto the wall in front of her, her shadow with the sewing machine was projected, at its side a film with a woman at a sewing machine in silhouette. a huge loop sliding along the floor, along the wall, under the roof and through her sewing machine. she did her job with the needle and holes deflorated the silhouette image in closer and closer succession.¹¹



Figure 2.19: *Reel Time* (1974) by Annabel Nicholson.

In this work, Nicolson sits in a room before an audience trying to thread film through the needle of a sewing machine. A projector throws a beam of light onto her, casting a large shadow onto the wall in front of her. A second projector shows a previously filmed movie of the film that she is trying to thread through the needle. During each try, the film

¹¹ http://www.luxonline.org.uk/artists/annabel_nicolson/reel_time.html

in her hand and the projected film are damaged. The two processes, Nicolson threading and the projected images, create a relationship in the form of a loop between the sewing machine and the film projector. The projected film of Nicolson sewing the film begins to fall apart as the needle punches into the film and damages it until it breaks, ending the work. I see this work as an early example of haptic cinema using the art of implication. It is implied that through a tactile approach to materiality that Nicolson is impacting the projected images. Nicolson's work suggests that there can be an authentic relationship between an off-screen action and the profilmic material as will be required between the material objects and the filmed material in haptic cinema.

2.3.2 Video Installation: Multiple Monitor Display

*The spectacular history of the expanded forms of video installation can be seen as an extension of the techniques of collage into the temporal and spatial dimensions provided by video monitors placed in an inter-textual dialogue with other materials.*¹²

John Hanhardt

Multiple monitor display, also known as multi-channel production, was a strategy that challenged the format of broadcast television and pulled audiences from the comfort of their living rooms into the public spaces where it was installed. Nam June Paik did what seemed to be everything possible with a television set. Of primary interest for haptic

¹² Handhart, John. "De-collage/Collage: Notes Toward a Reexamination of the Origins of Video Art." *Illuminating Video*. 79. Print.

cinema is his embedding of monitors into familiar contexts as a way of humanizing technology.



Figure 2.20: Nam June Paik 1983

Beginning in the 1960s, Paik explored television as an art object and as an expressive medium. Using the physical material of the television, he constructed "sculptures and installations that commented upon the increasing ubiquity as well as the psychological and sociological power of the television within the increasingly globalized world culture of the 1960s." One of his seminal works is *TV Bra For Living Sculpture* (1969), which literally connects the body and technology. In this work, his collaborator Charlotte Moorman, played a cello while wearing a bra in which the cups were made of two small televisions. The work was described by Douglas Fogle in his curatorial essay, *The Shock of the View*, for the Walker Art Center.

Originally, when this work was used in performances, the sound played by Moorman on her cello was filtered through a processor which would change, modulate, disrupt, and regenerate the live television images playing on the video screens of her TV Bra... As a pioneering work of video sculpture it transgressed the various traditional boundaries of art, but also the boundaries of conventional science and engineering.



Figure 2.21: Nam June Paik and Charlotte Moorman *TV Bra For Living Sculpture* (1969)



Figure 2.22: *TV Cello* (1971) by Nam June Paik

A television is commonly thought of as being in a home and positioned directly in front of the viewer. In Paik's *TV-Garden* (1974), the television was removed from its usual setting and put into a "garden" of tropical plants. Thirty televisions were used in the installation. The viewer was for the first time, placed in a superior physical position by virtue of feeling more empowered by looking down on the television sets.



Figure 2.23: *TV-Garden* (1974) by Nam June Paik

Beryl Korot's *Dachau 1974* (1974) moves between the past and present of the former Nazi concentration camp. In this provocative work, a fixed camera mounted on a tripod frames the vestiges of horror while tourists, full of life, mill around. The work was exhibited using four playback decks connected to four monitors, which spatialize the imagery horizontally. Filming with a camera mounted on a tripod, Korot questioned how best to breathe life into the static frame and to structure a narrative based on visuals rather than a literary model. For the answer, she drew upon her knowledge of weaving, remembering that it takes a minimum of four threads to bind a cloth. From there, she applied a formalist approach to construct the work using four monitors as her weaving

threads. In an online article *Auschwitz: Inside the Nazi State*, *Dachau* on the PBS website she recalls:

Each channel is assigned a slightly separate rhythm of image and 1 second black pause for the duration of the work. These pauses interrupt the narrative, allowing identical images to be played against one another but with slightly different timings.

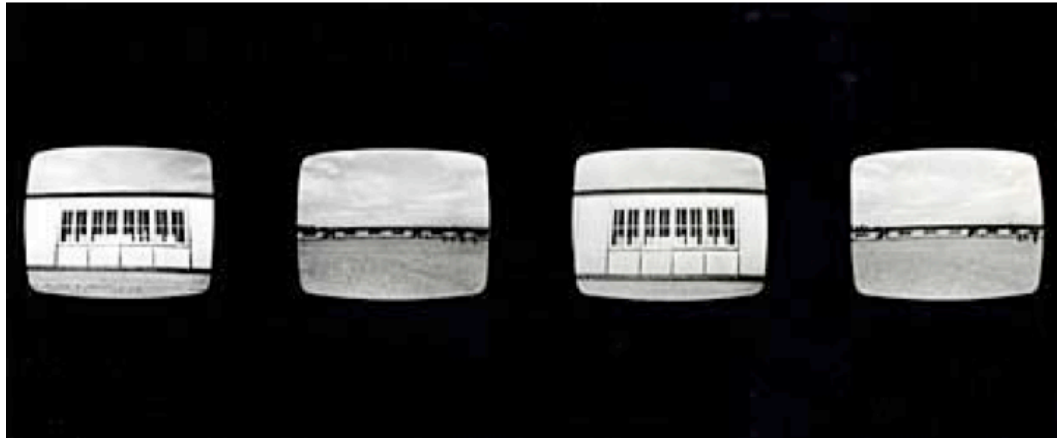


Figure 2.24: Multi-channel installation *Dachau 1974* (1974 by Beryl Korot

I am reminded by Korot how ephemeral each of the works in this chapter is. Several have ceased to exist in their original form. Each is delicate in its own way. Between the fragility of the celluloid and the changes in technology, the works have moved into archival or invisible status. In an interview on the *Public Broadcasting Service* (PBS) website, Korot bemoaned the fact that she could not respond to requests to exhibit *Dachau 1974*. Finally, she decided to pull the four channels into a single channel work while preserving the image of the four monitors. She acknowledges that it is not the same, but that the feeling and the meaning are present.

In this chapter, I presented different types of cinematic practices that are under the larger umbrella of expanded cinema. While not widely known, artists working in

industrialized cinema and interactive cinema have drawn from these experiments, as I will discuss in the following chapter. For purposes of haptic cinema, I draw on the following influences from expanded cinema practices:

1. Image Capturing

Moving picture imagery is captured using lens-based media.

2. Materiality

The physical material of the cinematic apparatus is handled.

3. Spatial Montage

The moving image is presented through multiple displays.

4. Simultaneity

New associations are created when presenting multiple sequences through multiple displays simultaneously.

5. Implying Interaction

The viewer is pulled into interacting psychologically because the onscreen character has broken the fourth wall.

6. The Moving As An Object

Each image within a frame can be viewed as an object with its own behavior.

7. A Nonliterary Model for Narrative

Both literary and nonliterary models can be used to build a narrative.

8. Video installation

Moving images can be displayed within various structures.

CHAPTER 3

INTERACTIVE CINEMA

Digital technology has made a significant impact on moving image practices, so much so that we describe the effect as a "revolution." One critical result of the digital revolution is that there is little distinction between celluloid and electronic moving image practices. Whether the moving image is photographed using celluloid, electronic video, digital videotape or is recorded directly to a hard drive, the material is scanned or imported into a computer where it can be manipulated and organized. At the end of this process, it can be exhibited through a digital display system such as a projector, plasma television, or mobile phone.

In this chapter, which is situated between experiments with analog and electronic media and the next chapter, which posits my concept of haptic cinema, I present and analyze how newly developed and available tools have facilitated artists' desires to expand cinema through interactivity. Subsequently, the look of cinema has changed: temporal montage, previously considered the essence of cinema, gives way to spatial montage; the multi-linear narrative takes center stage, and the viewer is thrust into the role of interactor. What has emerged is a new relationship between cinema, the artist, and the viewer.

3.1 Direct Access

In 2006, internationally acclaimed Welsh filmmaker/multimedia artist Peter Greenaway, known for pushing the structural and aesthetic boundaries in his films, (*The*

Belly of an Architect, The Cook, the Thief, His Wife & Her Lover, and The Pillow Book), stated in a YouTube video, "cinema is dead." He saw two indications of this: first, that one of Hollywood's most celebrated directors, Martin Scorsese, continues to make films where the narrative format and character development is almost identical to the films produced by D.W. Griffiths in the early 1900s.¹³

The old fashioned ideas of a narrative, sit-in-the-dark Hollywood centered narrative, bookshop cinema, is finished. Cinema is passive. You look at it in the dark. What the fuck are you doing in the dark? Man is not a nocturnal animal. It's looking in one direction and the world is all around you, and you have to sit still in your seat for two hours. So, we have to break all those barriers down.¹⁴

In the same YouTube video, Greenaway gives the second indicator of the death of cinema, the introduction of the remote control. "I'll tell you the exact date that it died. It occurred on September 31, 1983 with the zapper, the remote control."

The television remote control first made a commercial appearance in the 1950s where it was known as LazyBones. The device was connected to a household television that had a motor that controlled the tuner through the remote by way of a cable. In the 1980s, the remote was updated with infrared technology. The absence of the cable provided mobility for television viewers who could now control if, when and from where they wanted to access a new channel.

The remote control did not cause the death of cinema as Greenaway theorized, but it did provide new possibilities for how the moving image might be viewed, particularly

¹³ "YouTube - Peter Greenaway - "Martin Scorsese""
<<http://www.youtube.com/watch?v=EwSnePNTQ5M&feature=related>>.

¹⁴ "YouTube - Peter Greenaway, Cinema = Dead." <<http://www.youtube.com/watch?v=-t-9qxqdVm4>>.

when it was paired with another platform, the videodisc, also known as a Laserdisc. An analog version of the videodisc was first introduced in 1978 with the digital version arriving on the market in 1983. This read-only optical disc could hold substantial amounts of audiovisual information that was accessible in any order with the use of a remote control or a computer interface. The advent of the addressable videodisc provided the opportunity to access selected information multi-sequentially. For the first time, artists could control a narrative path in an electronic medium. Fast forwarding and rewinding as required when using celluloid or videotape became outdated metaphors. An artist could go from frame 10 to frame 600 without serially going through the preceding frames. Pioneering interactive filmmaker, Grahame Weinbren, remembers, “It is 1981. They show me a videodisc. They explain what it is and how it works. And I realize that the language, the possibilities, the significance of cinema is forever changed.”¹⁵ This is what I think Greenaway meant by the death of cinema.

In the imaginations and hands of artists, the videodisc was more than a distribution or publishing medium. It was an authoring medium. Performance artist Lynn Hershman created what is considered the first interactive videodisc. *LORNA* (1979-1983) tells the story of a woman who sits in front of a television set changing channels. The more she watches, the more she is afraid to leave her apartment. Viewers were encouraged to free Lorna from her fears by pushing buttons on their remotes that corresponded to numbers placed on various items around her room.

¹⁵ Random Access Rules Grahame Weinbren

These items represented chapters in LORNA's life and opened up into a branching structure where multiple variations in the plot could be seen from several points of view. Three endings to the story were provided.



Figure 3.1: Still image from interactive cinema installation *LORNA* (1973) by Lynn Hershman

LORNA was an interactive cinema installation, but also a public performance. Viewer-interactors were also a part of the installation. Writer Gabriella Giannachi observed in her online description of the work (<http://presence.stanford.edu:3455/Collaboratory/347>):

And while the viewer could carefully move through the plot of Lorna's fragile existence, they themselves could also become the focus of other viewers' attention. It is possible for further viewers not only to watch Lorna's life on the television screen but also to observe the 'active' viewer's interaction with her. Watching Lorna thus entails the possibility of seeing not only the life of Lorna but also the viewer's own reconstruction of her life.

Documentary filmmaker Glorianna Davenport co-founded the MIT Media Lab and directed the Interactive Cinema research group from 1987–2004. She created the

first large scale multilayered interactive documentary, *New Orleans, 1983-1987: A City In Transition* (1982 -1987), which presented stories of how New Orleans changed after the Louisiana World Exposition in 1984. Designed primarily for students in Urban Planning, the groundbreaking production included fifty characters and five interwoven storylines. Each scene had metadata attached, which allowed seamless access to the three hours of video from six videodisc players. In addition to moving images, viewer-interactors could access notes from the production team, information about the major characters, newspaper articles and legal summaries.

3.2 Interactive Art

Some readers might view the use of the remote and the videodisc as little more than technological determinism, with artists following the technology. As Jay Bolter and Richard Grusin remind us in *Remediation: Understanding New Media*, "New digital media are not external agents that come to disrupt an unsuspecting culture. They emerge from within cultural contexts, and they refashion other media, which are embedded in the same or similar contexts" (1998, 19).

All forms of art are interactive, whether painting, sculpture or film. Interactivity in art is not limited to work that responds in a physical way to a person's physical gestures. It is interactive in that it requires the viewer to regard, interpret and reflect, all of which are embodied active processes. For example, earlier I mentioned the video *Undertone* by Vito Acconci, which implied interaction by creating a psychological relationship between the artist and the viewer. Theorist Vivian Sobchack argues in *Carnal Thoughts: Embodiment and Moving Image Culture* (2004) that to consider

cinema as simply audiovisual is to misunderstand the many layers on which cinema works, in particular, how it is synaesthetic, an integrated coordination of the senses and the intellect. In his book, *The Language of New Media*, Lev Manovich expresses his concern for a reductive view of interaction:

There is the danger that we will interpret “interaction” literally, equating it with physical interaction between a user and a media object ... at the expense of psychological interaction. The psychological processes of filling-in, hypothesis formation, recall, and identification, which are required for us to comprehend any text or image at all, are mistakenly identified with an objectively existing structure of interactive links (2001, 57).

In the film *Rashomon* (1950), director Akira Kurosawa explores a psychological collaboration with the viewer with his design of a film told from four perspectives. The story is about the rape of a woman and the subsequent murder of her husband. There are four witnesses (including the dead husband who speaks through a medium), who have contradictory accounts of what they saw.



**Figure 3.2: Still image from the film *Rashomon* (1950)
by Akira Kurasawa**

Kurosawa used the strategy of a revised telling of one event, which inserts breaks into the narrative, and a subjective camera, which allows us to be positioned as a judge weighing the information. This use of psychological collaboration remains important, even as we incorporate the physical actions of a viewer by calling on them to interact.

Interactive art, however, occurs in a digital environment and is designed for a specific type of collaboration between a viewer and computer. This communication results in a physical change in the art as it unfolds to fully express itself. In her book, *Hamlet on the Holodeck: The Future of Narrative in Cyberspace* (1997), Janet Murray describes the construction of this interaction as *procedural authorship*, whereby we write the rules that will govern the viewer-interactor's experience (1997, 152). Unlike a painting or unisequential film, interactive art requires the artist to write the rules that will govern the relationship between the viewer and computer, which includes how the computer will respond to input. Interactive art concerns itself with not only psychological collaboration, but also with procedural authorship and participation, (all of) which make up the interactive experience.

Interactive cinema is a form of interactive art that depends on viewer interaction in order to present itself. In this type of cinema, a multi-sequential structuring of the moving image and sound is a priority. Some of the conventions of motion picture production are retained, however the organizing of the imagery shifts from temporal to spatial montage. In interactive cinema, the movie screen extends to a graphical user interface (GUI) window where a viewer, who is now an interactor, must explore the work in order to experience it. The interactive cinema artist uses the representational property of the movie camera that photographically renders action over time, and the

representational properties of the computer in the codified rendering of responsive behavior (1997, 74).

3.2.1. Early Approaches to Interactive Cinema

Wizard of Oz Approach

In the field of human computer interaction (HCI), there is a type of experiment called the Wizard of Oz, in which subjects are made to believe that a system is responding to their input. However, a human positioned out of sight that is actually operating the system. Early interactive filmmakers used this same type of experiment to explore the possibilities of interactive cinema. These experiments were designed for a group experience and took place in traditional movie theatres. The objective was to retain the traditional extended movie theatre experience while adding interaction.

During the 1967 Montreal Expo, Czechoslovakian filmmaker Radúz Činčera presented his forty-five minute film (coupled with a live performance), *One Man and His World*, which is considered the “precursor of interactive cinema.”

The film was stopped several times to give the audience time to vote, by pushing red and green buttons near their seats, on which direction the action of the film should take.

Audience consensus governed the direction of the next section of the film. As Michael Naimark wrote, “Činčera wrote the script such that each scene ends back at the same next option, regardless of which was chosen. To create the illusion of interactivity, the projectionist switched the lens cap between two synchronized film projectors based on the voting results” (<http://stage.itp.nyu.edu/history/timeline/kinoautomat.html>). It was a

structuralist version of interactivity with the projectionist controlling the sequencing. In using this design, a framework for considering multi-sequential narrative and viewer interaction was established.

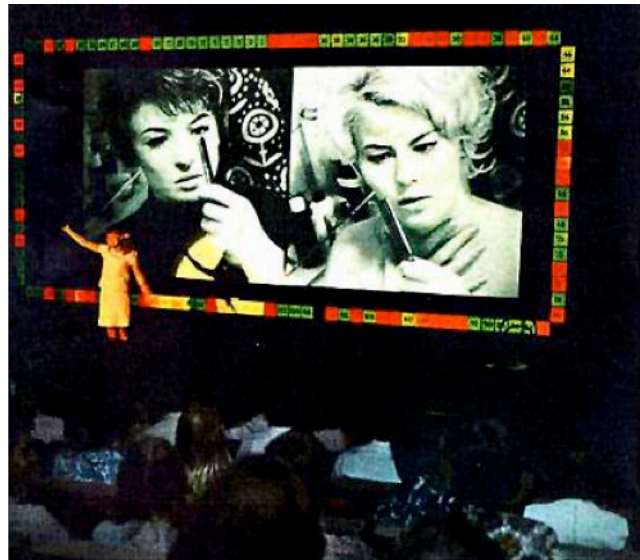


Figure 3.3: Still image from the film *One Man and His World* (1967)
by Radúz Činčera

The approach used in *One Man and His World* was updated in the early 1990s by the company Interfilm, which produced several films exhibited in movie theatres that were outfitted with equipment for voting. Audiences used a push button control system that was embedded into the arms of the chair to vote on the options provided for the narrative path. Behind the scene was a projection system that used four videodisc players to handle scene switching, and a digital video switcher. A CD-ROM contained the installation program, and a computer was used as a mediator. Within a twenty-minute film, audiences had opportunities to choose one of the three directions that the story might proceed. Interfilm experimented with the number of decision points. One film might have one decision point every minute, while another offered decision points every

fifteen seconds.

Another interactive film was *Mr. Payback* (1995), directed by Bob Gayles, was a twenty-five minute film about a lackluster man who turns into a superhero.

Photographed on industry standard 35mm film and transferred to videodisc, the film played in forty-four theatres outfitted with one hundred pistol grips with color-coded buttons that allowed viewers to vote on the actions that the protagonist would take. The film was explained to the audience by a live emcee who encouraged viewers to, "behave as if you were in a barn."¹⁶ The admission ticket allowed viewers to see the movie three times in one sitting. At intervals throughout the film, an onscreen prompt appeared signaling the audience to vote on the next action of the hero by pushing one of the available buttons. Simultaneously, a computer with a custom microprocessor and circuit boards controlled four laserdisc players, which manipulated the flow of the story on screen. Thirty scenarios were possible before the story repeated itself.

Each of the examples is set in a movie theatre and depends on audience consensus to determine the narrative. In *One Man and His World*, Činčera's screenplay is such that regardless of the audiences' choices, the film returned to the same "next" option. The screenplays of the Interfilm company provided various decision points in the plot. It has been noted, however, that audiences were conflicted when juggling between engagement and staged interactivity.¹⁷ *Mr. Payback* used a more theatrical set up in which to prepare audiences to interact with their films by using an onstage emcee. Although the artists

¹⁶ Miller, Carolyn Handler. *Digital Storytelling: a Creator's Guide to Interactive Entertainment*. Amsterdam: Focal/Elsevier, 2008. Print.

¹⁷ *ibid*

used the viewer's familiarity with established viewing literacies, there was no support for transitioning between the ordinary world of the movie theatre and the special world of the film. Engagement with the special world was abruptly interrupted (each time) the viewers (were) called back to make a decision about the world from which they were ejected.

Collective authorship

A distinctive form of interactive cinema was the Argentine film, *La Hora de los Hornos* (The Hour of the Furnaces) (1976), which was produced as part of the Grupo Cine Liberación (The Liberation Film Group), an Argentine film movement formed in the 1960s. Part of the group's manifesto was to disregard the idea of an auteur in favor of collective authorship. Out of this movement came the four-hour film, *La Hora de los Hornos*, which focused on Argentine culture and politics. The construction of the film involved audience participation. During production, various screenings were held. At certain intervals, the projectionist was instructed to stop the film to allow the audience to engage in dialogue about what they had seen. In the paper *Beginning, Middle, and End - Not Necessarily in That Order* (1996), William Homer Hilf writes, "The filmmakers also left the film open-ended so that they could change the film as a result of audience participation, thus, hypothetically, no screening was ever the same as the previous screening" (<http://www.cybertown.com/hilf.html>).

3.3 The Digital Environment

Shortly after *One Man and His World* and *Mr. Payback* were produced, the book *Hamlet on the Holodeck: The Future of Narrative in Cyberspace* (1997) by Janet Murray was published. For the first time, we were given critical language and a structure for conceptualizing, designing, and critiquing multi-sequential interactive narratives. Murray identified four properties and three aesthetic concepts of digital environments. These frameworks are useful in helping us to identify and understand the challenges in constructing interactive cinema.

The four properties of digital environments are *procedural*, *participatory*, *spatial* and *encyclopedic*.

1. Procedural: Digital environments require written rules that will govern the interactors' experience as well as the visual and audio material that will be displayed. This is procedural authorship.
2. Participatory: Digital environments can be programmed to respond to the interactors' input.
3. Spatial: Digital environments are spatial in that we can navigate through them by means of input devices.
4. Encyclopedic: The computer can store seemingly endless amounts of information in any form.

Using Murray's list, we can now say that in the early examples of interactive cinema, the procedural authorship and participatory qualities were limited and therefore did not deliver satisfying interaction.

Murray's three aesthetic concepts, *immersion*, *agency* and *transformation* give us an opportunity to consider the value of aesthetic pleasures.

1. Immersion: The ability for a digital environment to pull us into its world, where we are eager to psychologically collaborate by agreeing to believe in the rules of the new world.
2. Agency: The way that we can perform a meaningful action and see results.
3. Transformation: The computer's ability to simulate an environment in which we can role play.

Again, using Murray's framework, we can say that in the earlier examples of interactive narrative, attention was paid to immersion by acknowledging the viewer's familiarity with established viewing literacies. The films were projected in a traditional movie theatre and were produced as you would produce a commercial feature length film.

These choices set the stage for audiences to be psychologically immersed. However, the immersive experience was then broken by the requirement to perform an action as a way to reenter equivalent to breaking a fourth wall in theatre and allowing someone on stage to speak directly to the audience. The rules of the new world required a flow between the ordinary world and special world. During the early experiments, there was no history for this type of engagement with the moving image in a commercial setting. Primarily, all of

the examples removed agency, which is important to interactive art. It was the projectionists, rather than the viewer-interactor, who had agency. The audience's buttons and pistol grips were props that became symbols of a lack of agency. Only if there is a significant sense of agency, are the viewer-interactors more willing to allow themselves to be immersed.

3.4 Towards Spatial Narratives

Industrialized cinema was designed to produce an image that would fill a single frame regardless of whether or not the frame was a movie screen or television set. Spatial narratives reconsider this by dividing information within a single frame or across multiple displays. There are three concepts that contribute to spatial narratives: the image as an object; temporal montage within a co-sequential or multi-sequential environment; and spatial montage. The first two concepts occur within a film environment that is unisequential and emphasizes temporal montage. The last concept occurs within a digital environment.

3.4.1 The Image as Object

In the book *The Classical Hollywood Cinema: Film Style and Mode of Production* to, Bordwell, Staiger and Thomson describe Hollywood cinema and identify three rules of production: it should tell a story that is easy to understand; the production behind the story should remain invisible; and the story should have an emotional appeal that can

traverse class and nation.¹⁸(1985, 3). Within this context, industrialized cinema claims for itself a greater illusion of “realness” than any other art form. However, increasingly the notion of realness is dependent on the image as an object that can be fully manipulated. In a digital environment, images can be scaled, repeated, looped, and layered. Each image can have its own patterns of behavior while coexisting seamlessly with other images, each with its own behavioral patterns. Imagery can be created within a single frame almost indefinitely through this layering or compositing approach. This process is known as special effects, where recorded material is altered. Where once the production part of cinema was considered the area where "art" and the notion of reality was being produced, now it is within the area of post production where "art" and "realness" are constructed through special effects. In digital cinema, the raw recorded material is used primarily as source material on which overlays of digital treatments are applied. As Lev Manovich argued, "In short, the production becomes just the first stage of post-production."¹⁹ In this sense, all imagery becomes a form of data.

3.4.2 Temporal Montage Within Co-sequential and Multisequential Structures

Fundamental to the construction of unisequential cinema is temporal montage, which is used to construct meaning or create cohesion from a series of filmed shots. The production and post-production process is based on an editor organizing strips of visual and audio information into a cohesive work. The completed work is usually not in the chronological order of when it was captured by the camera or audio recorder. If

¹⁸ Bordwell, David, Janet Staiger, and Kristin Thompson. *The Classical Hollywood Cinema: Film Style and Mode of Production to 1960*. New York: Columbia Univ., 1985. Print.

¹⁹ Manovich, Lev. *The Language of New Media*. Cambridge, MA: MIT, 2000. Print.

photographing based on a screenplay, all of the scenes that take place in a given location are photographed at the same time, regardless of where they appear in the story. The most valued editors pull shots for mood and tone to support the narrative flow, even when the shots do not match the continuity of action, rearranging scenes which don't work as originally conceived, and employing jump cuts, transitional devices, and audio to facilitate the trajectory of the narrative. They compress and expand time and give just enough clues to an audience to help them fill in the meaning. This is how temporal montage works. The process always results in a unisequential structuring of narrative, which is also dependent on the length of the physical material, celluloid or videotape. In a unisequential construction, moving image sequences appear as a series of shots that are executed one after the other, usually within a single display.

Some commercially released films have used temporal montage while introducing co-sequential and multi-sequential spatial constructions. In a co-sequential structure, two streams of visual information are presented within a single display. In a multi-sequential structure, three or more streams of information are presented within a single display. The HBO movie *The Laramie Project* (2002) uses co-sequential composition to unfold the narrative of a gay bashing and murder of college student Matthew Shepard in Laramie, Wyoming. It intertwined reenactments, newsreel footage, and dramatizations that were sometimes presented in two rectangle frames within the overall screen.



Figure 3.4: Scene from *The Laramie Project* (2002) directed by Moisés Kaufman

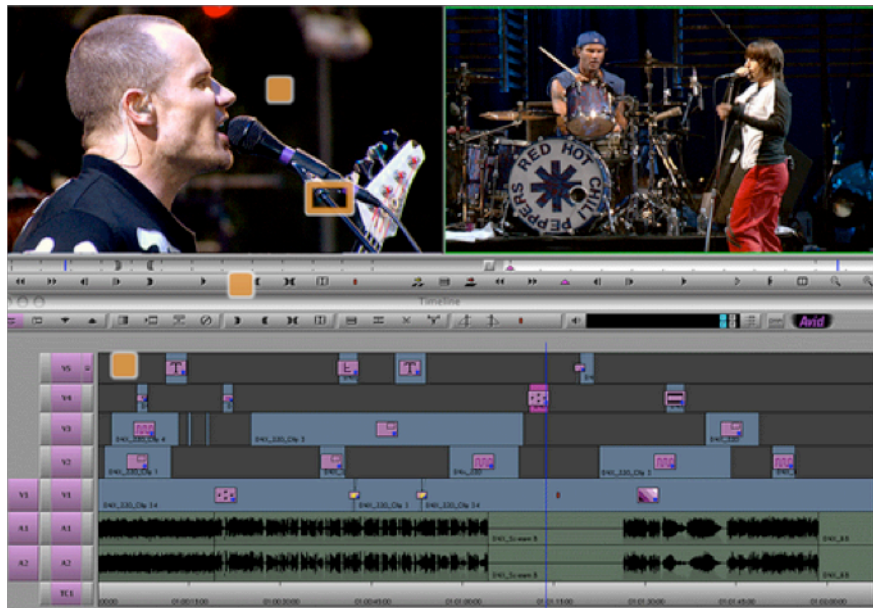
The film *Time Code* (2000) spatializes imagery by sectioning the screen into four frames. Although the information in each frame runs simultaneously, viewers are guided to focus on a specific frame through the raising and lowering of the accompanying sound. Each screen presents material that occurs within the exact same time.



Figure 3.5: Still image from the film *Time Code* (2000) by Mike Figgis

The four frames represent a multi-sequential structuring of information. While *Time Code* used its multi-frame presentation to represent different moments within the same time, *The Laramie Project* used its dual frame presentation to traverse different times.

Manovich noted that when writing his book, *The Language of New Media*, he did not find many examples of spatial narratives in analogue cinema. Earlier I discussed how artists Rubin and Warhol pioneered the concept. In Julie Talen's online article, *Split Screen's Big Come Back* she traces the renewed interest in exploring spatialized narratives within a traditional form to the nonlinear editing system called the Avid Media Composer, which was released in 1989 for the Mac II.²⁰ The Avid interface allows an editor to see and control two moving image streams that appeared next to each other in rectangle boxes.



**Figure 3.6: Interface from a single monitor for
Avid Media Composer**

²⁰ Talen, Julie. "Glimpse Culture ||| Julie Talen ||| 24: Splitscreen's Big Comeback." *GLIMPSECULTURE.COM || FILMS AND ESSAYS BY JULIE TALEN || Pretend*. Web. 03 Dec. 2011. <http://www.glimpseculture.com/essays/24_splitscreen_comeback.html>.

This arrangement is the first time outside of the double projection or multiple monitors used in final presentations, where editors could see and control two different sequences of information running simultaneously within a single monitor. *The Laramie Project* editor, Brian Kates, was inspired to try split screen after having worked with the Avid. In Julie Talen's online article, *Split Screen's Big Come Back*, Kates describes some of the challenges (http://www.glimpseculture.com/essays/24_splitscreen_comeback.html).

The single biggest question when the screen divides is: Where is now? Which panel is the single shared moment in time that heretofore defined single-channel movies? And when are the other panels happening: earlier, later, or at the same time? Cutting up the screen unmoors the images in time. Clearly the simplest answer is to say that the frames are all now, all the same moment. You've divided up the screen but not the time. In "Timecode," we're always at the exact same time on all four screens. ... The joy is in simultaneity, disparate events, and angles divided in place but not in time.

The missed opportunity, however, seems to be designing for simultaneity in away that emphasizes image association. As Munster writes in her article *The Screen Divided*, "Narrative more generally can be seen to rest not upon linearity and singular viewpoint but on the layering combination and texturing that different sequenced modules bring to events."

3.4.3 Spatial Montage

Spatial montage in digital media expands the opportunities to bring together different types of images into one frame. In chapter 2, I presented strategies, in particular those by Rubin, Warhol, and Korot, who all explored spatial montage using analog film

and electronic video. I refer again to Bolter and Grusin, we are constantly remediating, borrowing from older forms and concepts.

Manovich expands on the concept of montage to include spatial montage, applying it within the context of digital media specifically within a graphical user interface (GUI) window. Within this context, any number of image types appearing simultaneously on the screen can create spatial montage if the artist creates the reasoning for their appearance, arrangement, and relationship to each other (2002, 323).

Temporal montage is a linear process in which individual shots are organized along a single path. In digital cinema, there is the opportunity to organize audiovisual information along multiple paths and layers. In interactive cinema, several considerations allow for a different organizational approach to recorded material:

1. The cinema screen now includes the bit-mapped computer display.
2. In digital cinema, any image can be treated as an object that can be manipulated and placed anywhere on a display.
3. Digital images can appear next to each other or layered on top of each other. This process allows for multiple streams of different types of information to occur simultaneously.
4. The digital environment is navigable.

Recorded visual and audio information is scanned or imported in a computer, where it can be edited. However, with the information now in a digital form and the screen now a GUI window, information is visible on the surface of the display or on subsequent layers that can be nested. In a GUI environment, collage becomes a form of montage, and montage becomes spatial. The information is spatialized horizontally and vertically.

Additionally there are layers of invisible information that we can access when navigating through various segments with input devices as well as the human body. When information becomes spatial, we gain the ability to display a variety of information simultaneously, which leads to multiple associations. Manovich described the shift from temporal to spatial as where "...the logic of replacement, characteristic of cinema, gives way to logic of addition and coexistence (2000, 325).

3.5 Sequence

In the new symbiotic relationship between the filmmaker, computer, and viewer-interactor, filmmakers interested in interactivity sought to find their footing in a new environment. Pioneering interactive cinema artists such as Grahame Weinbren were concerned about narrative cohesion if the filmmaker was not in control of sequencing as reflected his following quote where he considers deemphasizing sequence as one way to approach structure. In his article, *Random Access Rules* (1989) he writes:

The structure of a film is determined by the sequence of its elements. But if sequence is an aspect of the film no longer determined by the filmmaker, what kind of structure is available? If the author of a work is to retain his authority, sequence must be deemphasized since it is an aspect of the experience that the filmmaker, to a greater or lesser degree, is passing on to the viewer.

This statement was published in the late 1980s, the decade when artists began to experiment with the remote control, random access, and the first desktop computer. For filmmakers, issues of control were, and remain, critical. Control is in the editing process and few directors who work in industrialized film practices have control, or the right to approve the "final cut". Against a critical backdrop of published work on digital media

that began in the 1990s and continues today, Weinbren's statement may seem naïve.

However, within the context of film editing, where meaning is constructed, the concern was appropriate and important.

Today, we understand that in interactive cinema, the filmmaker remains the author and that that authorship includes the designing moving image sequences and the rules that will govern and shape the viewer-interactor's experience. The viewer-interactor may be able to control the order in which sequences are viewed, but how this happens and the resulting associations depend on the filmmaker's ability to control the complex sequencing involved in designing interactive cinema. The early interactive cinema artists continued to expand the boundary of what cinema can be. Haptic cinema draws inspiration from many of the concepts presented. In particular, it concerns itself with:

1. Procedural authorship

The author writes the rules that will govern the viewer-interactor's experience.

2. Multi-linear narratives

Several event streams can occur simultaneously.

3. Multi-sequential narratives

There can be several ways of organizing information by the viewer-interactor.

4. Interaction

The viewer-interactor can perform a meaningful action and receive a response from the system.

CHAPTER 4

HAPTIC CINEMA

“The real issue is not to make another scientific toy, but how to humanize the technology and the electronic medium ... and also, stimulate viewers' fantasy to look for the new, imaginative and humanist ways of using technology.”

Nam June Paik
Videa, Vidiot, Videology

4.1 Theoretical Framework

Cinema began as haptic. It involved physical gestures and the manipulation of material objects. In the late 1800s, the popular entertainment of the day was vaudeville, an entertainment format that presented a variety of acts including comedy acts, magicians, mind readers and ventriloquists. It benefited from a modular structure in which disconnected performances could be swapped in or out depending on the desires of the audience. There was something for everyone. Within this environment, inventors of equipment that exploited optical illusion or the persistence of vision sought to compete for audiences' attention and profit by providing a theme-based continuity approach to entertainment. Their coin-operated, hand-cranked machines allowed a single user to see a short film. For example, the mutoscope worked like a mechanical flip book. Instead of flipping through drawings in a booklet, viewers saw individual black and white photographs that were affixed to what looked like a large Rolodex. While turning the hand crank, the viewer looked into a lens that was shielded by a hood to see a one-minute film made of more than eight hundred photographs. The phenakistoscope used a

series of pictures around a spinning disk that had slits that spread out from the center.

The disk was attached to a handle. When the viewer looked through the slits and turned the handle to spin the disc, the motion of the photographs created the illusion of movement or a motion picture.



Figure 4.2: Woman hand cranking a mutoscope

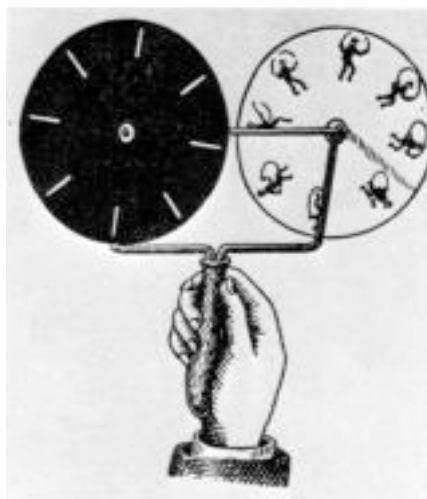


Figure 4.2 Hand holding phenakistoscope

In her book, *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses* (2000), media theorist Laura Marks identifies the first use of the word "haptic" in relation to cinema in the writing of *film critic* Noël Burch, who used the term to describe the “stylized, flat rendition of deep space” in early cinema. Similarly, it appears in the work of Antonia Lant who noted the confluence of Egyptian themes and “Egyptian” space in cinema of the 1910s. Philosopher Gilles Deleuze referenced a shot in Robert Bresson’s *Pickpocket* (1959) as *haptic* (2000, 171). Marks builds upon and extends the use of *haptic* in cinema for her concept of haptic visuality, in which images are presented in a way that stimulates our eyes’ desire to “brush” up against or touch them on the screen.

Rather than making the object fully available to view, haptic visuality puts the object into question, calling on the viewer to engage in its imaginative construction. Haptic images pull the viewer close, too close to see properly” (1999, 16).

Film and video makers can produce this withholding of optical clarity as a strategy in many ways. They can film something in such extreme close-up that only its texture is evident. They can blur an image so that the spectator knows that something is present, but is not sure what. They can also layer images to the point where the density makes the viewer unsure of what she is to consider. These strategies invite closer inspection because they remove our visual authority by removing the spatial relationship usually provided by depth-of-field, negative space, and implied gravity. In our inability to master the image, Marks argues, we are forced to call upon our haptic visuality.

What is particularly salient to my argument for haptic cinema is Marks' analysis of cinema as a multisensory experience that considers the value of material objects. She

constructs her argument using case studies from intercultural cinema that "call upon memories of the senses in order to represent the experience of people living in the Diaspora" (2000, xi). Living in the Diaspora means being displaced particularly through colonialization, exile, or emigration. There is often little or no visual proof that an event occurred if not registered by the official witnesses and recorders of history such as in print media, photography, or film. In Diasporic histories, those in power construct the official record. This leaves a chasm between the official history and the private memory of the displaced. One way of organizing and transmitting "unofficial proof" is through oral tradition and material objects.

Using films produced by intercultural filmmakers as case studies, Marks theorizes how physical objects can serve as stand-ins for lost physical evidence for filmmakers who are working with themes of identity, loss, displacement, and alienation. The filmmakers "excavate memories from objects" which "condense time within themselves". These objects "can encode knowledge that become buried in the process of temporal or geographic displacement but are volatile when reactivated by memory"(2000, 85). One example of this is the documentary film *History and Memory: For Akiko and Takashige* (1991) by Rea Tajiri, a Japanese American filmmaker. Tajiri's father was drafted into the army before Pearl Harbor, and her mother was interned in a camp. Through the documentary, Tajiri tries to understand Japanese internment from a personal and historical perspective.

She uses interviews, archival footage, and images of the camp where her mother was interned, and tells the story of how her father returned home from the war to find that his family's house had been removed.



Figure 4.3: Still image from the film *History and Memory: For Akiko and Takashige* (1991) by Rea Tajiri.

There is no physical evidence of the family's trauma, nor did the family speak of the experience. In the process of making the film, among her mother's belongings, Tajiri discovered a small wooden bird, which appears to have no meaning until she connects it to the archival footage of the camp where the prisoners carved such objects. The bird was Tajiri's first personal object that could provide evidence of her mother's internment.

Marks' analysis of haptic visuality serves as an analytic framework for considering the implied interaction between a viewer and the object that is represented. My concept of haptic cinema is inspired by Marks' analysis -- that meaning resides in material objects, which can bring to mind memories that are stored in our bodies. This is particularly useful for anyone who is interested in the construction of narratives that have yet to be absorbed into official histories. Although none of the filmmakers whose works

are described by Marks as *haptic* would describe themselves as practicing haptic cinema, her compelling arguments have inspired me to expand on her work.

While Marks investigates the value of filmed material objects, others view the idea of materiality through the increasing loss of the body to virtual worlds where there is no physical graspable forms. We have instead, what John Unsworth at the University of Illinois calls “digital surrogates.” Installation artist Vibeke Sorensen considers this when theorizing about her work in an online interview (<http://umanitoba.ca/schools/art/galleryoneoneone/vs02.html>).

There are more and more people who spend most of their time in cyberspace, and less and less time engaging the natural world around them that actually sustains them.... So there is a need to bring people back to the “real world.” The problem with technology as interface is that the complex intelligence of a living person or creature is not there, and so a disassociation results. What is the skill set that will help people do this, and ultimately to survive in the new physical-digital world

By “real world,” Sorensen is referring to a world where human contact with material objects matters.

The graphical user interface serves as the most familiar bridge to the virtual world, allowing one to be simultaneously visible (by inserting information with a mouse and keyboard or using an avatar) and invisible (No one knows what you look like). For some, particularly in the early days of the Internet, the absence of any identifying marks of humans was heralded. However, there is much rethinking in this area. For example, authors Alondra Nelson, Thuy Linh N. Tu and Alicia Headlam Hines criticize concepts such as “color-blind future” and the promise of “abstract citizenship” in their book *Technicolor: Race, Technology and Everyday Life* (2001). “Race, in interplay with gender, class, and sexuality, is a crucial category by which people define themselves,

form their communities, and reflect on their cultural histories" (2001, 28). This idea is often challenged, as Nelson, Tu and Headlam confirm, "Techies often repeat that talent - good code - is all that matters online, not race, social connections, or capital" (2001, 28). Culture matters. One representation of culture is material objects, and it is here that haptic cinema has much to offer. In this arena, someone must be present to touch and/or manipulate something with some part of his or her physical body, often times when other people are watching. Haptic cinema asks us to acknowledge categories that we generally use to identify and form our communities, to be visible, often with others present and watching as we interact with material representations of our world.

It should be noted that not everyone considers the digital environment to be immaterial. In the collection *Digital Material: Tracing New Media in Everyday Life and Technology*, the editors argue against the idea that the digital environment is immaterial. Software, they argue, is not a metaphysical substance in virtual space. Although it does not have a physical element to explore through touch, it is embedded in materiality by way of physical data carriers.²¹

Haptic cinema constructs a synaesthetic experience by considering the relationship between the moving image, objects, memory, and how a viewer might interact in this relationship. The objects can be reflected upon and contemplated while also serving as what Murray would describe as *threshold guardians* to other worlds.

²¹ Marianne van den Boomen, Sybille Lammes, Ann-Sophie Lehmann, Joost Raessens and Mirko Tobias Schäfer, "Introduction: From the Virtual to Matters of Fact and Concern," in *Digital Material: Tracing New Media in Everyday Life and Technology*, Amsterdam University Press, Amsterdam, 2009, pp. 9-10.

4.2 Material Objects

In the last ten years, my interest in material objects has deepened because of three influential events: 911; Hurricane Katrina, and the foreclosure epidemic. These events share tragedy and loss as themes. Additionally, they highlight material objects disconnected from their owners, but retaining the knowledge of their own histories.



Figure 4.4: Still image from the film *911 Objects and Memory* (2003), by Jonathan Fein and Brian Danitz.



Figure 4.5: A foreclosed home.
Photo by T.J. Proechel

There continues to be a growing body of work, particularly in the social sciences and the arts, that reconsiders the meaning and value of objects. Marks wrote, "Meaning is encoded in objects, not metaphorically but through physical contact. Following

historians and theorists of gifts and commodities, I suggest that objects are not inert and mute but that they tell stories and describe trajectories."



Figure 4.6: Christmas ornament in a gate, Ninth Ward, New Orleans. Photo by Chris Jordan

Chris Gosden and Yvonne Marshall argue in *The Cultural Biography of Objects* that personal biographies in museum presentations present objects as passive while people are viewed as active. This "diminishes or obscures objects' agency in shaping a life by restricting them to memorial or representational roles, and limiting the range of their effects to impressions on a somewhat disembodied mind, rather than a sensing and perceptual body" (1999, 177). Reflecting on the value of material objects, anthropologist Janet Hoskins writes in *Biographical Objects: how things tell the stories of people's lives* "What I discovered, quite to my surprise, was that I could not collect the histories of objects and the life histories of persons separately. People and the things they valued were so complexly intertwined they could not be disentangled" (1998, 2). These views emphasize objects as active participants in the lives of people. Material objects and

people share a biography, objects can serve as witnesses and official keepers of culture in much the way that cinema can.

Early cinema, and particularly the 1920s' avant-garde, seemed to fetishize the object in a preoccupation to bring it to life through animation techniques. Brook Henkel's articulation of "*cine-thing*" identifies this practice as a strategy for rethinking the relationship between people and material objects seen as "non-human companions." According to Henkel, through the animated expression of objects, film was thought to "... transform the relationship between people and inanimate objects: to place a whole array of non-human things into different and far less marginalized positions with respect to speaking human subjects" (<http://thingtheory2009.wordpress.com/2009/06/29/cine-things-1915-1925>). In the same online article, Henkel a dedication by early filmmakers to giving objects life. In his book *The Art of the Moving Image*, Vachel Lindsay identified the "non-human object" as the hero in films. "... while the producer remains utterly unconscious of the fact. Why not face this idiosyncrasy of the camera and make the non-human object the hero indeed" (1915, 35)? If the object was to be a hero, it was also to be the star performer in all films produced by the Italian Futurist Cinema project as stated in the 1916 manifesto.

[Our films will be:] Filmed Dramas of Objects: (Objects animated, humanized, baffled, dressed up, impassioned, civilized, dancing—objects removed from their normal surroundings and put into an abnormal state that, by contrast, throws into relief their amazing construction and nonhuman life.)

Henkel notes four features of *cine-thing*:

- Cinema is understood to grant an expressive and animated life to the normally inanimate thing.

- These newly enlivened things stand to challenge the usually dominant position of humans with respect to the world of things; they become themselves “nearly homogenous with man,” “characters in the drama,” or “the hero in most any sort of photoplay.”
- Their *personalities* or *physiognomies* suggest an unruliness and irreverence with respect to the audience and filmmaker alike.
- Cinema’s ability to seemingly grant life to inanimate thing brings with it a new visual knowledge—that by isolating objects and removing them from their familiar contexts, film allows the viewer to experience the usually hidden “construction and nonhuman life” of things.

Pixar Animation Studios has made a series of films about "things". Their first film, *Luxo Jr.* (1986) was a computer-animated short film in which large and small desk lamps are the only characters in the film. They are given qualities that suggest a parent-child relationship. The child, a smaller white spring-arm lamp plays with a small rubber ball while the parent, a much larger table lamp reacts to the playful spirit of the child. When the child continuously jumps on the ball until it breaks, the parent admonishes the “child,” who then finds an even larger ball. In this first film by Pixar Entertainment, there is no human-object relationship, unlike Pixar's follow-up film, *Toy Story* (1995) produced with Disney. In *Toy Story*, toys have full lives and a full range of emotions, are aware of their own history, and are able to fantasize. They are loyal to their owner, but go mute when humans are present.



Figure 4.7: A scene from the film *WALL-E* (2008) by Andrew Stanton

In the film, WALL-E, a robot designed to clean up the evidence of overconsumption left by humans.

How can the notion that objects can be shown to possess an inner life be useful for haptic cinema?

4.3 Tangible Narratives

There is a history of constructing narrative with objects: ancient scrolls, story boxes, and quilts are just a few examples. Fluxus artists created Fluxkits, also known as Fluxboxes, which were usually the size of a briefcase or a shoebox). These tactile boxes or cases contained a collection of objects that were meaningful to the artist and given to an audience to interact with.

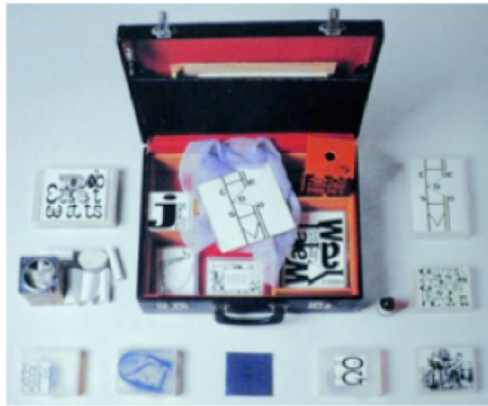


Figure 4.8 George Maciunas' Fluxus Box



Figure 4.9: Ay-O's Finger Boxes (1964)

As described on the Art Is Open Source website, "Fluxboxes were intended as *non-linear narratives* to be handled, touched, performed, disseminated, destroyed, reassembled, counted and reconfigured." Another example of material objects that support narratives are *Fingerboxes*, created by Japanese Fluxus artist, Ay-O. You can insert a finger into a hole to feel other objects inside (see figure 4.9). A box might contain objects such as feathers, a rubber membrane, or thumbtacks.

Assemblage artists have long constructed narratives using three- using objects. Two artists who were inspirational to me in the early stages of developing work on the tabletop were Albert Chong and Betye Saar. From an aerial perspective, their work, as seen in figures 4.10 and 4.11, reminds me of the surface of a tabletop with objects. Both artists often blend photographs with material objects to reanimate their family histories and explore political, personal, spiritual and cultural issues.



Figure 4.10: Record for Hattie by Betye Saar



Figure 4.11: Ascension by Albert Chong

4.3.1 Interactive Tangible Narratives

In addition to handling and organizing objects to construct narratives, we can also interact with objects and receive feedback from a system. An example of this is *genieBottles* by Ali Mazalek. The system presents a story that is told by three genies that live in glass bottles. If one bottle is uncorked, the genie that lives inside will talk to the interactor. If several bottles are uncorked, the genies will talk with each other. Mazalek describes her motivation for creating the project in the SIGGRAPH published paper *genieBottles: An Interactive Narrative in Bottles* (2001):

We felt that by applying a tangible interface to the field of interactive narratives, we could provide stories with a means of escaping from the computer box and into our physical environment. Our *genieBottles* provide an engaging interactive story experience in which the audience can go beyond the visual and auditory senses, and make better use of their sense of touch.

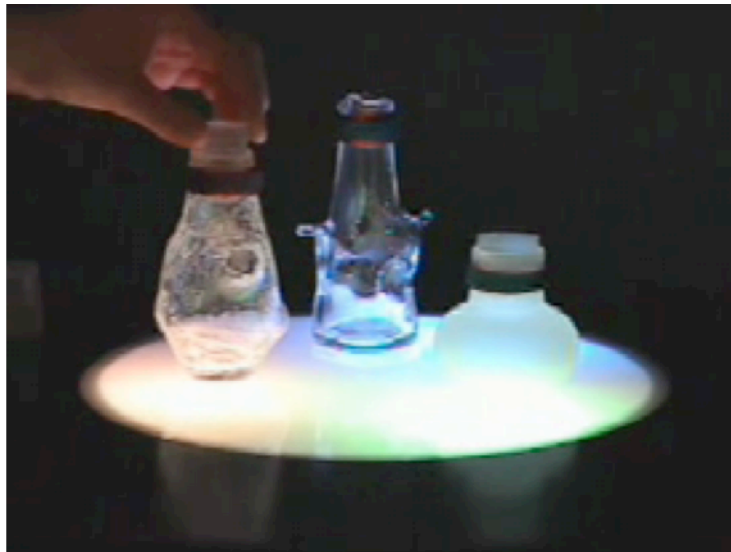


Figure 4.12: *genieBottles* by Ali Mazalek

Another related work is Vibeke Sorensen's *Moroccan Memory II* (1999). It is interactive, cinematic, and haptic. It is described by Sorenson as an interactive computer piece that explores individual and shared memories by drawing on visual, aural, and textual documents of actual experiences in Morocco in the 1960s and 1970s, and recorded secondary experiences in popular media throughout the century (<http://visualmusic.org/text/MMdoc.htm>).



Figure 4.13: *Moroccan Memory II* (1999) by Vibeke Sorensen

In this work, viewer-interactors make associations through "personal and cultural memory fragments" by exploring objects through smell and touch. They are able to freely move around the structure of this installation, which is constructed like plush Moroccan tent and contains boxes filled with spices that can be open and closed. When a

viewer-interactor opens a box, one of the sixty-four short story fragments play on a screen via rear screen projection. Each of the six boxes contains a custom chip that sends radio waves to a receiver that tracks the state of the boxes, whether they are open and closed, through a MIDI signal.

4.4 The Tabletop

In the field of human computer interaction (HCI), the tabletop is one of the seven genres of tangible user interfaces (TUI's) as defined by Hiroshi Ishi. As an interactive display surface, the tabletop uses an application to receive and track input through fingertips or tagged material objects that are manipulated by users of a system and sensed and tracked by an application. Published studies on the tabletop have come primarily from researchers in the HCI community who have emphasized its utilitarian value in an effort to unlock its commercial potential. In her doctoral dissertation, *Media Tables: an Extensible Method for Developing Multi-user Media Interaction Platforms for Shared Spaces*, Ali Mazalek writes:

While the need for tabletop display surfaces seems to have been recognized by a number of researchers who have explored various interactive applications on tabletops, none of the early attempts point to a general purpose, economically viable tabletop display and interaction platform. In particular, existing examples have not succeeded in providing an extensible architecture that can support a diverse range of applications that would be required for everyday use by many people."

The primary research with the tabletop has focused on a number of areas. Jeff Han has worked on developing the underlying sensing technology. Katherine Everitt and

others have explored document handling (*DocuDesk: An interactive surface for creating and rehydrating many-to-many linkages among paper and digital documents*). Mathew Kam and others have considered games (*Designing Digital Games for Rural Children: A Study of Traditional Village Games in India*). Designs for collaborative work surfaces were explored by Paul Marshall and others (*When the Fingers do the Talking: A Study of Group Participation with Varying Constraints to Tabletop Interface*). A few researchers have considered applications for artistic disciplines. For example, Mazalek explored multiviewpoint storytelling (*TViews: An extensible architecture for developing multi-user digital media tables*). Sergi Jordà led the team that developed a music application (*reacTable: exploring the synergy between live music performance and tabletop tangible interfaces*). Peter Vandoren and his team explored digital painting (*IntuPaint: Bridging the Gap between Physical and Digital Painting*). Tabletop researchers are challenged by how to design applications that are not only for single users for a single purpose. Through my art explorations, I have identified the tabletop as a medium for an art practice that expands cinema.

The inspiration for the tabletop as a medium for an art practice is based on the work of Mazalek who is interested in tangible narratives. Her *Tangible Viewpoints* is a particular example of this, and she has created a system to experiment with the idea of tangible narratives within the context of multi-viewpoint stories that could be in the form of text, audio, video or still images (2002).

Although the experiments that she describes remain primarily as audio and text files, her subsequent *TViews* platform have used video clips. The system has been

designed to "support the sharing of collaboratively constructed multimedia stories in a social setting" (2002).

Haptic cinema references Mazalek's work, but departs from it by considering the tabletop as a medium for artists interested in expanding cinema as described earlier. I identified the interactive digital media tabletop as a medium however, it is not a medium in the traditional sense. Here, a different interpretation of medium is useful, one as articulated by Peter Weibel in the LEONARDO, Computer Art in Context Supplemental Issue (1989) who described a medium as "...a corpus of aesthetic strategies inherited from previous media." The tabletop can be viewed as an amalgam of cobbled together parts, ultimately presenting itself as a tracking and projection system. The tabletop as a medium for haptic cinema offers new opportunities for artistic expression and viewer experience. This includes having the viewer feel a closer sense of identification with the narrative using material objects.

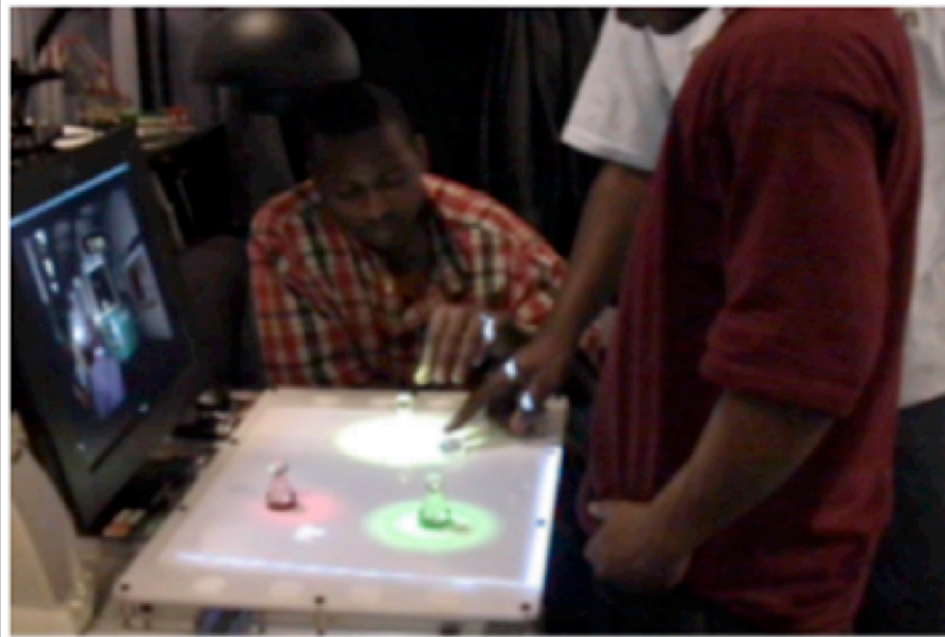


Figure 4:14: Clubhouse members engaging in Tangible Viewpoints storytelling application.

Haptic cinema requires the sensing and tracking of physical objects. One platform that can be used for haptic cinema is the interactive digital media tabletop. When haptic cinema is practiced using the tabletop, a subgenre is created, which I am calling *tabletop cinema*. In haptic cinema, a tabletop that uses a computer vision tracking system to track tagged objects and fingertips is used. Objects can also be tracked using other types of sensing technologies. For example, acoustic sensing, where objects can be located by embedding ultrasonic transmitters inside of them (Mazalek et al 2006). There is also electromagnetic sensing, where a time-varying interrogation signal interacts with tags disposed on a surface and read by a series of sensing coils that send signals to control circuitry to assist with tracking objects (James Patten et al *Proceedings of CHI 2001*). Haptic cinema can be developed using any one of them. However, the best system for haptic cinema is a computer vision tracking system that tracks tagged objects and fingertips such as reacTIVision (Martin Kaltenbrunner and Ross Bencina TEI 2008). It provides for the digital media artist an off-the-shelf, inexpensive, easy to assemble, and stable system that can be supported by an open-source framework. The basic elements for this type of tabletop, excluding applications and application programming interfaces (APIs), are a projector, camera, infrared lights, a computer and a table with a surface that allows for the image(s) from a projector to be displayed.

A digital tabletop can be constructed in any size, height or shape that can support the necessary hardware. In my visit to Jeff Han's studio, a tabletop used finger tracking and was more than twelve feet wide. Other tabletops have been as small as a shoebox. The flexibility works well for haptic cinema, which adjusts its physical design based on

the needs of the requirements of the narrative.

In chapter 5, I discuss my experiments on a custom-built portable tabletop where I explore scalability, object sensing and identification, and multiple projections.

4.5 Defining Haptic Cinema

In the preceding chapters, I described how artists have approached the moving image to expand cinema. Haptic cinema is informed by these practices. On the next page is a chart that shows the influences of *expanded cinema practices of the 1960s and 1970s, interactive cinema, material object theory, assemblage art* and *tangible narratives*, which have been discussed in preceding chapters. In looking at the influences, the shape of haptic cinema is formed.

Table 1: Influences on Haptic Cinema

Expanded Cinema (1960s, 1970s)	Interactive Cinema	Material Object Theory	Assemblage Art	Tangible Narratives
<p>Image Capturing Moving picture imagery is captured used lens-based media.</p> <p>Materiality The physical material of the cinematic apparatus is handled.</p> <p>Spatial montage The moving image is presented through multiple displays.</p> <p>Simultaneity New associations are created when presenting multiple sequences through multiple displays simultaneously.</p> <p>The moving as an object Each image within a frame can be viewed as an object with its own behavior.</p> <p>Nonliterary model for narratives Both literary and nonliterary models can be used to build a narrative.</p> <p>Implying Interaction Onscreen characters can break the fourth wall and appeal to the viewer-interactor.</p> <p>Video installation Moving images can be displayed within various structures.</p>	<p>Procedural authorship The author writes the rules that will govern the viewer-interactor's experience.</p> <p>Multi-linear narratives Several event streams can occur simultaneously.</p> <p>Multi-sequential narratives There can be several ways of organizing information by the viewer-interactor.</p> <p>Interaction The viewer-interactor can perform a meaningful action and receive a response from the system</p>	<p>We have a rich connection to material objects Objects can be handled by an audience and sensed by a system.</p> <p>Fluxus Concepts Meaningful material objects are part of the narrative. An audience can handle these objects.</p>	<p>Objects are used to create narratives. Physical structures and material objects can be used to construct a narrative</p> <p>Objects are used to construct three-dimensional compositions.</p>	<p>Objects are used to create narratives. Physical structures and material objects can be used to construct a narrative</p> <p>Objects are used to interact with a system We can identify and track objects.</p> <p>Interactivity We can have a meaningful conversation between the digital and physical worlds.</p>

The chart reveals that haptic cinema is a genre of interactive cinema that is situated within the historical practices of expanded cinema. It uses lens-based media for image capturing. Viewer-interactors can engage with audiovisual information through material objects that are tracked using sensing technology. The information is presented across multiple displays simultaneously. This requires the viewer-interactor to make associations, which adds layers of meaning to the work.

Haptic cinema is not a new technological invention. Rather, it rethinks existing approaches to the moving image and their platforms. As Bolter and Grusin argue in

Remediation: Understanding New Media:

Introducing a new media technology does not mean simply inventing new hardware and software, but rather fashioning (or refashioning) such a network. The World Wide Web is not merely a software protocol and text and data file. It is also the sum of the uses to which this protocol is now being put: for marketing and advertising, scholarship, personal expression and so on. These uses are as much a part of the technology as the software itself (2000, 19).

CHAPTER 5

ARTWORK EXPLORATIONS

*I am intrigued with combining the remnant of memories, fragments of relics and ordinary objects, with the components of technology. It's a way of delving into the past and reaching into the future simultaneously. The art itself becomes the bridge.*²²

Betye Saar

This chapter describes the design, development and analysis of five haptic cinema projects. Each system began with an analysis of content, which then influenced the system design. The process was one of iterative design across the systems with the limitations of each design contributing to the ideas and development of the next. The five projects are *of a moment when...*, *Flying Over Purgatory*, *CrazyQuilt Sightings*, *HER* and *Making Beauty*.

²² "Betye Saar - Artist Statement." *NETROPOLITAN: Museum Without Walls*. Web. 1 Dec. 2010. <<http://www.netropolitan.org/saar/saarstat.html>>.

5.1. of a moment when... (2006)

5.1.2 Overview

This production was the first prototype for haptic cinema. For the production, women of different ages and diverse backgrounds were asked to tell a story or perform an action that represented a moment when they experienced something that shifted their thinking about life. Because of this experience, they realized that they were different way. The stories were videotaped and then categorized by an emerging theme from which the top three were selected. The themes were *freedom, the body, and dreams*. Nine videos were selected for the project and organized into the three themes. The maximum running time for each video was one minute.



Figure 5 1: Woman showing art object in the production, *of a moment when...*

Woman #1 presents an example of one story here. In the video, she walks us through her home where she has created an international art collection over a period of twenty-five years. As she points out the quilts, beaded headdresses, pottery, and glass sculptures,

she describes a moment with her father.

Woman #1: I think that my interest in art can be traced to having been the daughter of a high school art teacher, though I didn't realize it at the time. So I grew up around my father always being surrounded by art and talking about art and being in and out of his classroom because we went to school where he taught art. Now, unfortunately my father didn't encourage us to take an art class or teach us how to do anything and when I realized as an adult that I was really interested in art I asked him why he had never done anything with his three daughters about something that he really cared about and he said it never occurred to him. He never thought about it.

5.1.3 Physical Design

The physical design of the production was intended to inspire touch and to reference women's memories as being held in the body. To this end, I used a life-size female mannequin that was supported by an adjustable pole. Around her waist was an open wire-framed skirt. I covered the skirt with crepe paper strips to make a colorful skirt that would shield a monitor.



Figure 5.2: Life size mannequin with two monitors, one in the belly, one in the skirt. Three boxes are used for objects.

Two monitors were used. A small hand-size monitor was positioned at the belly. The second monitor was positioned within the skirt and showed a loop of images of women. Its screen covered with a piece of magnifying acetate to enlarge the video images and change their 4:3 aspect ratio to an amorphous one, making the imagery dreamlike.

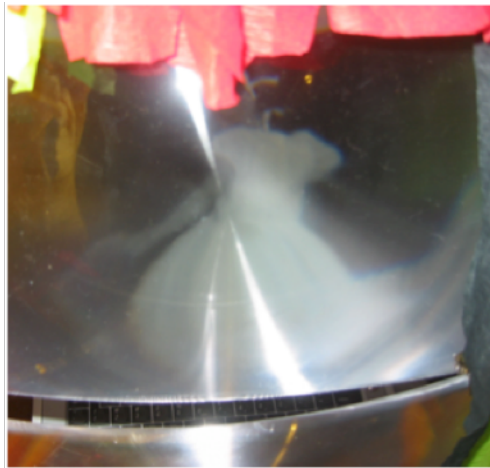


Figure 5.3: Image of second monitor behind skirt. Over the screen is a flexible magnifier.

On a small table in front of the mannequin were three satin covered closed boxes, yellow, pink, and blue, each with a raised figure of a mannequin. The three boxes related to the three themes. Each box contained a token object (ring, cigar, coin). The skirt had an opening through which one could see the images on the second monitor.

The design was intended to inspire touch. It used multiple displays to create a spatial montage.

5.1.4 Technical Design

This was a prototype design for which I used the Wizard-of-Oz approach. A MacPro laptop was used to run Max/MSP with the JITTER video/graphics library.²³ The laptop was positioned next to the mannequin so that I could key in input to substitute for what would eventually come when the RFID tags were used to trigger the video information to begin.

5.1.5 Interaction

The production was primarily for design and feedback purposes and was not fully implemented. Viewer-interactors were told how the project would work in its final iteration. They were then asked to walk through the process of opening a box and placing the object from the box on the small table. Once they completed this action, I would use the keyboard input to trigger the corresponding video. If the participant chose the yellow box, for example, a video that related to the theme of freedom would play.

5.1.6 Viewer Feedback

Most of the participants were very engaged with the stories and forgot that they could use another item to call up another set of stories. They wanted to know more about the particular women whose stories were presented. I initially thought that some viewer-interactors did not realize that the work was interactive. However, I learned that the female form, its size and the colorfulness were intimidating to many. Several of the male

²³ Max/MSP is a cross-platform graphical environment for music, audio, and multimedia. JITTER extends Max/MSP to support realtime manipulation of video, 2D/3D graphics and other data sets.

participants were uncomfortable looking through the dress to see the additional layers of moving images beyond the stories that were told in the belly monitor.

5.1.7 Reflections

A primary feature of the production is calling attention to the viewer-interactor as a voyeur and stimulating their haptic visuality. This is done by partially hiding one monitor behind the skirt. The desire to see the images fully and more clearly requires that you bend down and spread the skirt. Most male participants were uncomfortable, almost squeamish, viewing the images behind the skirt while women seemed delighted. In a traditional cinema experience, one can be a voyeur and still maintain some degree of anonymity as each person sits quietly side-by-side watching the screen. With haptic cinema, there is a greater chance that viewer-interactors will have to push past their levels of discomfort to publicly engage with the work while others watch. This creates a circle of voyeurism with the viewer-interactor engaging with the work and an audience watching them. In particular, *of a moment when...* interrogates viewers about their attitudes around gender by using the female form and embedding in it images of women. Touching and interacting with a tangible female form, particularly in public, carries taboos and transgress overtones. The work requires that you come close and touch in order to access more information. This project was an initial exploration that validated and put into place the basic electronic elements that would be used in subsequent projects. What was most valuable was that viewer-interactors were very interested in the stories and wanted to know more about how the objects related to the stories.

The design raised new challenges. In particular, how to signal that the work was interactive; how the system would sense that someone was present; where to conceal the

RFID tags; and how to control the distance between the viewer-interactor and the mannequin, while still maintaining physical contact. The viewer-interactor needs to be a certain distance from the displays to see the imagery. They also need to be close enough to some portion of the installation to interact with the objects. These issues informed the next project.

5.2 Flying Over Purgatory (2006 - 2007)

5.2.1 Overview

Flying Over Purgatory is set in post-Apartheid South Africa and in Philadelphia during the 1960s Civil Rights era. It is based on my original feature-length screenplay of the same name. Parts of the screenplay are based on testimonies given before South Africa's Truth and Reconciliation Commission (TRC), and my interviews with survivors of Apartheid violence. The testimonies and interviews were then used as source material to develop dialogue for the script.



Figure 5.4 Early mockup for *Flying Over Purgatory* prototype.

There are four primary characters of which two are used in this experiment: *Mrs. Modjadji*, an elderly South African woman who witnessed the murder of her daughter by a policeman; and *John Mthetwa*, a former police officer who killed Mrs. Modjadji's daughter and is seeking amnesty. Both characters speak directly to the viewer-interactor.

Mrs. Modjadji #1: We were asleep. There was a knock on the door. She.. my daughter opened the door and.. I heard her scream. My husband ran to her. I could do nothing. She was such a beautiful girl. Now... There... on the ground... Part of her face missing. I could do nothing. I am afraid to sleep.

Mrs. Modjadji #2: They want me to testify. I am a woman who according to South African law is only five years free. You have only heard stories of how horrible things were. I have seen with my own eyes... experienced it with my own flesh. I know what those people will do to me if I testify. No, I am sorry. I cannot do it. Do not call on me again.

Mthetwa #1: Don't be afraid. Look at me. Do I look like a man of power? I am not a man of power. I am just a simple person like you with a family and a job where I am told what to do. My orders were for her daughter. She was a political problem... Involved in things that she should not have been involved in. She was a woman who did not know her place. Did you know that?

Mthetwa #2: When you are given orders you must follow them because in the back of your mind you know that feeding your wife and children depends upon you following orders, so you must do it. Do you understand? If I killed without orders, killed just because I wanted to, then I would say that I am wrong. But I did not do this! I was given the authority to do so at that time. The whites, they have the authority, the power, but where are they? They are behind me. I am their shield. They push me to the front. They give me the order. I must do it. Do you understand? Do you understand me? I should be given amnesty because I followed orders. Do you understand me?

There is also a loop of Mrs. Modjadji repeating the word "no", which will be discussed under the technical design section.

5.2.2 Physical design

I designed and had built an eight-foot wooden female sculpture.



Figure 5.5: Setting up parts of the physical design.

A cutout section in the headdress and one in the belly each supported a monitor. As with the previous production, I used the open wire-framed skirt and decorated it to create texture and to hide the equipment. I also designed a wooden stand that was positioned waist high to the sculpture. This structure was a freestanding part of the sculpture and supported an outstretched acrylic hand. Hidden in wrist of the hand was a copper loop antenna connected to a RFID reader, which I modified so that it could fit into the wrist. From the fingers of the hand were three RFID tags hanging from long colored cords.



Figure 5.6: First iteration of physical design



Figure 5.7: Acrylic hand with modified RFID reader



Figure 5.8: Acrylic hand with modified RFID reader in stand.

5.2.3. Technical Design

I describe here the technical design of the production, including the materials used, the system states and the way in which the challenges identified in the previous work were addressed.

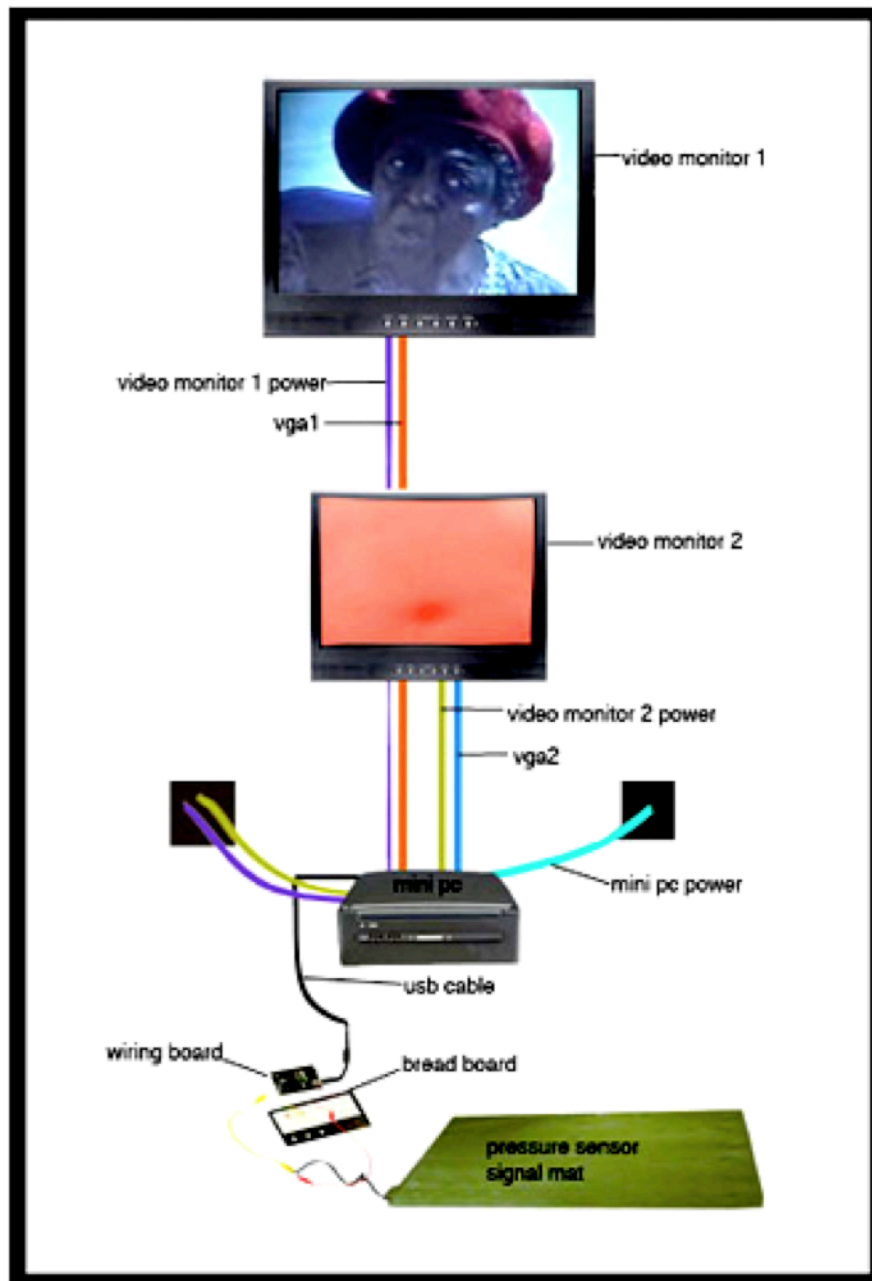


Figure 5.9: Technical elements for *Flying Over Purgatory*

Materials

- **Custom built sculpture**

The structure served as a symbol for a woman's memories. Additionally it supports and conceals equipment.

- **23" x 35" pressure sensitive signal mat**

The mat was hidden under a rug in front of the stand, which supported the acrylic hand. It was used to signal when a viewer-interactor was in place.

The system would then display the first videos that provided instructions for the viewer-interactor on how to proceed.

- **RFID technology**

The RFID reader was too large to place into the wrist of the sculpture. I modified the reader adding a copper loop antenna that could be placed into the wrist.

Since the loop had to be coiled by hand, I used an inductance meter and a digital voltmeter to measure the inductance value to determine how many winds were needed

for the loop.

- **17" Video monitor (VM1)**

The monitor was embedded into the sculpture's headdress, which displayed the monologues of *Mrs. Modjadji*.

- **14" Video monitor (VM2)**

The second monitor was embedded into the belly of the sculpture and displayed a moving image of a breathing belly.

- **Wiring board**

This was used to control the pressure sensitive signal mat.

- **Mac G5**

All hardware was connected to the Mac, which ran software to control the work.

The programming was created in Max/MSP with the Jitter video/graphics library.

- **iPod and Speaker**

Used to store and playback looped sound.

The Mac was hidden behind the skirt together with the other equipment (except for the pressure sensitive signal mat).

System State

This interactive cinema installation had had three states: *welcome*, *default* and *interaction*.

- **Welcome State**

The system was in this state when it was not being engaged. During this state, the monitor in the headress displayed the named of the project and indicated that it was an interactive installation. There was imagery moving in slow motion in torso monitor montage of audio about apartheid in South Africa plays from a PC located behind the mannequin's skirt.

- **Interaction State**

Once a viewer-interactor stepped on the mat, the welcome state changed to the interaction state. The first event in this state was to provide instructions for the participant, which was done through text. The second event displayed a slow-motion video of *Mrs. Modjadji* seemingly watching the viewer-interactor in the

top display. The second display showed a breathing bellows with accompanying breath sounds. When the viewer put an RFID tag into the hand, the associated video would play in the headaddress monitor.

- Default State

If a viewer-interactor stepped away from the mat, the system would go into a default state, which was the slow-motion video of Mrs. Modjadji seemingly watching the viewer-interactor in the top display with the second monitor showing the breathing belly. If no one were present for more than one minute, the system would return to the welcome state. The system would also return to the default state each time a video ended.

Overcoming the Previous Challenges

The design was an extension of the one used in the first project, but with more detail. This installation was more clearly defined as interactive. The system could detect and respond to the presence of a viewer-interactor.

The four challenges from the first system were addressed in the following way:

1. How can the installation signal to the viewer-interactor that it is interactive?

This information was included in the opening title, *Flying Over Purgatory: an interactive installation*, shown in the upper monitor. Additionally, the outstretched hand with open palm seemed to beckon people to approach the work. As soon as they came close, they stepped on the mat, which triggered video playback. The open palm with RFID tagged objects hanging from its fingers gave

viewer-interactors an indication that an object could be placed in the hand and that it was okay to touch the hand and the objects.

2. How will the system sense that someone is present?

A pressure sensitive signal mat was used for this purpose.

3. How best to keep the hardware and wires out of sight?

The sculpture was designed to hide the equipment within its skirt and the wired behind its long neck.

4. How best to control the distance between the viewer-interactor, while still encouraging physical contact with the installation? The placement of the hand in the stand and the placement of the rug allowed me to control the viewing distance. The hand was in a pedestal on the rug and allowed the viewer-interactor to comfortably engage, while remaining sufficiently distant to have a good view of both video monitors.

5.2.3 Interaction

The viewer-interactor steps on the mat. The system goes from the welcome state to the interaction state, which provides instructions for engagement through text. Next, a slow-motion video of *Mrs. Modjadji* seemingly watching the viewer-interactor appears in the top display.

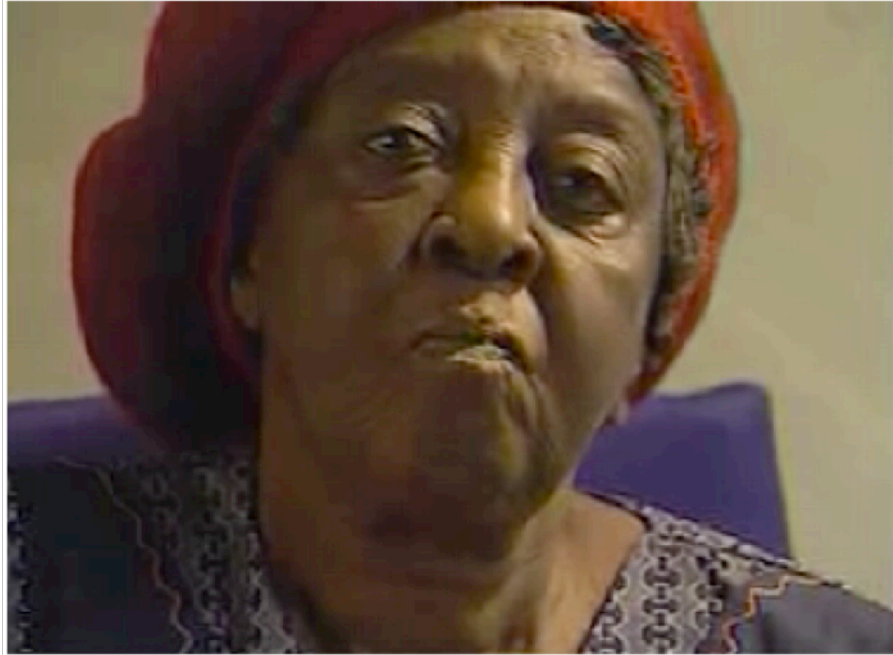


Figure 5.10: *Mrs. Modjadi*

The second display shows a breathing belly, which changes colors. It will either be red, blue or yellow. These colors correspond to the colors of the cords that hold the RFID tags. If the viewer-interactor chooses the red cord and places the tag in the sculpture's hand, the belly will immediately turn red and the associated videos will play in each monitor. Likewise, should they chose the blue cord and place the tag in the hand, the belly will turn blue and the associated videos will be displayed. When all three tags have been used, the system returns to its welcome state. When the viewer-interactor leaves the mat, the system will also returned to its welcome state.

5.2.4 Viewer Feedback

Viewer-interactors thought that the prototype was a unique way to present information for which they knew little about. They were comfortable with the distance

between themselves and the imagery. They wanted to know more about South Africa and several suggested that I create multiple structures to represent the different characters.

Some researchers have argued incorrectly about the relationship between the physical object and the assets that they trigger in this production (Tanenbaum, Proceeding AH '10) for this prototype. The prototype was in the early stages of design and implementation where stand-ins used to test the programming.



**Figure 5.11: Viewer-interactor engaging
with *Flying Over Purgatory***



**Figure 5.12: Viewer-interactor
engaging with *Flying Over Purgatory***



**Figure 5.13: Ayoka Chenzira
with second physical design for
*Flying Over Purgatory***

5.2.5. Reflections

Most viewer-participants quickly learned the relationship between placing objects in the sensing hand to display part of the narrative. They were engaged enough to see all of the videos. However, the delicate electronics proved to be too unstable. Transporting all of the associated elements resulted in the system frequently not immediately working when moved from one place to another.

Flying Over Purgatory represents a stage of experimenting with the transformation of various types of narratives into compelling tangible interactive experiences. I felt that the viewer-interactor could have been more deeply engaged in the narrative through a greater variety of tangible interactions. For example, using additional boundary objects that have simultaneous existence in the story space and in the viewer's physical space could have created a closer connection to the story world for viewers. This project gave me a greater understanding of the challenges of interactive cinema. In particular, what is the tangible means that allows one to jump into the story world?

The next three haptic cinema projects, *CrazyQuilt Sightings*, *HER*, and *Making Beauty* were designed for the interactive digital media tabletop using a marker-based computer vision tracking system (reacTIVision by Martin Kaltenbrunner and Ross Bencina TEI 2008). It can detect multiple finger touches. It also uses fiducial markers that generate a unique ID that can be used to trigger audiovisual information.

5.3 CRAZYQUILT SIGHTINGS (2008)

5.3.1. Overview

CrazyQuilt Sightings was based on the Hurricane Katrina disaster in Mississippi and Louisiana in 2005. Considered one of the deadliest storms in U.S. history, nearly 2,000 people lost their lives to the storm and the subsequent failure of the levees. Five years after the disaster, thousands of residents were still living in temporary housing.

I originally designed and executed a haptic cinema installation called *Survival Mode*, based on a diary of a survivor that was loaned to me for the project.

The project was exhibited at Spelman College during the spring and summer of 2008.



Figure 5.14 Early set up of *Survival Mode* at Spelman College

The project was constructed using excerpts of the diary, which were filmed, an original poem that I commissioned, and excerpts from a published essay. The design (shown in figure 5.11) was of a life-size kitchen that had been destroyed by the hurricane and the broken levees in New Orleans. On the dining table was a basket where a viewer-

interactor could place RFID tags to see various parts of the narrative or hear excerpts from the writings. In an effort to quickly learn what the advantages might be for developing haptic cinema on the interactive digital media tabletop, I used some of the imagery from *Survival Mode* to construct a walkthrough for *CrazyQuilt Sightings*. The title is taken from textiles where a quilt is made from irregular shapes of fabric and arranged in what appears to be unorganized patterns. The project was not fully implemented, but represents my process in learning how to move forward with haptic cinema.

Following are six excerpts from the diary. Each was filmed.

Diary Entry 1: The radio has the most unimaginable bad news. The scale and scope of this disaster is such that they are saying New Orleans is gone! Can that be true? How can a whole city be gone? I wish I could get some word out to my Dad that I am alright. I cannot imagine how my family must feel. I never thought that cell phones would not work. Did the storm knock out the satellites too? I have to somehow find a way to let at least one person outside of New Orleans know that I am alive. It was my decision to stay and I will take the consequences but it was never in my mind that I would be isolated from the rest of the world.

Diary Entry2 : Getting back to the prospect of looters, here is what I have to do. I have to prepare this house for a long sleep. I have to take anything of worth to me and build platforms in the rafters to hide and store them. In the rafters, I will store our files and books, all my trumpets, amplifiers, music and musical instruments, computers and printers, phones and faxes, TVs and radios, cameras, vases, kitchen appliances, bicycles, clothes and sundries. I will take the doors off the refrigerators and put them in the rafters. No one will steal a fridge without doors.

Diary Entry 3: I made coffee by heating water over a sterno can and pouring it through coffee grounds. It was warm but it worked. I have been eating boxes of raisins and pecans from our pecan tree every morning for breakfast. I take a handful of vitamins with some warm juice. I have a can of sardines for lunch and sardines or baked beans for supper. I eat peanut butter by the spoonful for dessert. I have been monitoring my weight each day and I am loosing about a pound a day.

Diary Entry 4: The water was thick with meat blood. Everything was rotten and stinking. The melted ice cream from the freezer compartment was thick, sour foam. Hundreds of loaves of bread were floating, fat and soggy. All the floating produce was swollen and slimy. There was floating fish, shrimp, hams, and turkeys. Anything that was stored on shelves from the waist down was underfoot. We made our way to the juice aisle and scooped up anything that was above the water. The same with tuna fish, Chef Boyardee spaghetti, peanut butter, chili, fruit cocktail, canned peaches, bottled water, and dog and cat food for the pets. The water is stinking to high heaven. The smell is everywhere. It's in the house and it's nauseating. It is turned into concentrated goo of oil, sewerage and who knows what. I am going to try to read myself to sleep again. It may take hours.

Diary Entry 5: My sister had some wisdom teeth pulled a year ago. She was given many pain pills that she never took. I found the pills and cut two Snickers Bars into eight pieces. I put a pill into each piece and fed the pieces to him one by one. He was wagging his tail at getting such a treat. I was crying as I handed him each piece. When he was done, I locked him in the back room for several hours. I would look in the room now and then in a grim deathwatch. The last time I looked in, he was gasping and making moaning sounds. I decided to take him closer to his grave because I was sure he was going to be dead soon. I pulled him outside. When he got out there, he ran under the house. I could not reach him so I decided to shoot him if he emerged. When I went inside the house, I could hear him gasping and making ungodly noises through the floorboards.

Diary Entry 6: the days in my post-Katrina, life may or may not be better. I will work hard to overcome her terrible influence. I was strengthened and weakened by her.

5.3.2. Physical design

The installation was designed for the custom-built Tangible Tracking Table (TTT) in Ali Mazalek's Synaesthetic Media Lab at the Georgia Institute of Technology. The table was built by Chih-Sung (Andy) Wu for the lab and will be described in the "technical design" section.

Most designs for the tabletop keep the surface clear of all but the objects that are used to access assets whose reflections will appear on the surface. This design did not work well for the project. Katrina left a physical mess. The aftermath of the broken, levees and the hurricane produced a crazy quilt arrangement throughout neighborhoods. Motorcycles, clothes, boats and people were in trees. Roofs were in the basement. Homes were in rivers. Bodies were in streets.



Figure 5.15: Ayoka Chenzira creating the physical elements for CrazyQuilt Sightings



Figure 5.16: Items for the CrazyQuilt Sightings project on tabletop

The project needed to reflect the randomness in its external design. I distressed bits and pieces of miniature objects and placed them around the TTT to suggest the disaster. The center was left clear so that objects could be placed and the associated audiovisual assets would have a place to be displayed.

Some of the objects were to establish mood, tone and a sense of place. Other objects were tagged with fiducial makers and could be moved along the tabletop to various points whereby the system would display associated video, audio or text information.



Figure 5.17: *CrazyQuilt Sightings* on Synlab tabletop

5.3.3 Technical Design

The prototype installation was designed for the tangible tracking table (TTT) in the Synaesthetic Media Lab at the Georgia Institute of Technology. The design and implementation are described in the paper, *Tangible Tracking Table: an interactive tabletop display*, by Chih-Sung (Andy) Wu (2008 *IEEE International Workshop on Horizontal Interactive Human Computer System*). The TTT is 50 inches wide and 39 inches tall. Inside were a projector and two mirrors used to display imagery onto the surface of the tabletop. The surface has an acrylic sheet with tracing paper that acts as a diffuser for the projector lamp. A camera is used for object detection. The system works through rear-diffused illumination (DI). In this method, infrared lights shines below the tabletop surface, an infrared filter is used for the digital camera lens, cut-infrared filter for the projector. When objects touch the TTTs surface, they reflect more light than the light that is diffused. This allows the camera to see the desired parts of the light spectrum, which represents the interaction on the tabletop.

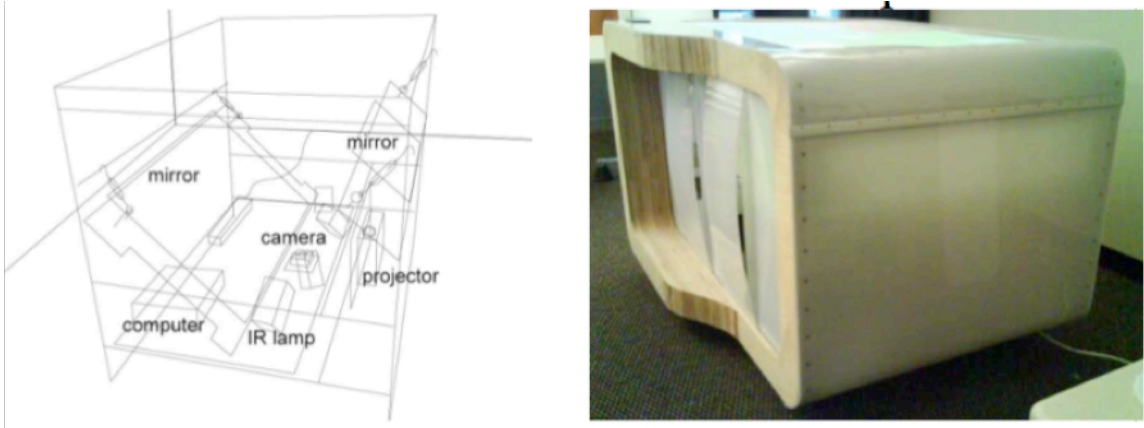


Figure 5.18: The perspective view and appearance of TTT designed by Chih-Sung (Andy) Wu for Ali Mazalek's Synaesthetic Media Lab at the Georgia Institute of Technology

5.3.4 Interaction

When viewer-interactors stand at the TTT they see material objects that represent devastated neighborhoods. A video loop is reflected on the surface of the table and shows objects being washed away by water from left to right: insurance policies, credit cards, toys, bottles of medication, articles of clothing, etc. Viewer-interactors could choose eight objects to place within in the center of the TTT. The objects were wooden blocks used as stand-ins. Six of the objects would trigger short video clips from the diary. Three objects were trigger clips of the following:

1. A man and woman sitting in a candle-lit kitchen eating food from cans.
2. A woman sweeping water out of a kitchen.
3. A woman wrapping a man's cut fingers with bandages

5.3.5 Reflections

The project was designed for me to understand how the TTT could be used as a visual frame and as a platform for developing haptic cinema. While it was not presented for viewer feedback, several concerns arose during the design process

TTT and the Moving image

The moving image is commonly positioned in front of you, for example in a film theatre or presented on television or a computer screen. An exception is viewing the moving image on a cell phone. Viewing the moving image on a TTT requires that the viewer-interactor look down on the movies. Looking down on moving images can be awkward, particularly if the interactive production is an unfolding narrative that requires ten minutes or more to reveal itself.

The Frame

Earlier I discussed how cinema artists have used co-sequential and multi-sequential structures within a single frame. The TTT surface represents a single frame. When multiple images are displayed simultaneously, each creates its own frame within the larger frame. This raises the issue of image association. What do the individual frames mean to each other and as a group within the larger frame? Authoring for multiple frames must take this issue of image association into account.

Positioning Digital Assets for Multiuser Simultaneous Interaction

Although the TTT used for this prototype is capable of supporting multiple users and simultaneous interaction, this approach does not work well for haptic cinema. Two issues emerged while designing the production: *orientation* and *screen real estate*.

Orientation

People will naturally organize themselves "behind" and to the "side of the table, even though the table (without information on the surface) does not suggest these references. When one viewer-interactor engages with the system, orienting the visual assets is clearly defined. The information must face the participant so that it can be read. If there are multiple viewer-interactors, the question arises, how to orient the information for multiple users who are maneuvering objects and triggering assets simultaneously. The physical design can suggest how viewer-interactors should place themselves. For example, using a second projector to display information on a wall will suggest to the viewer-interactor that they place themselves in a position to see the projection. Although many people comfortably collaborate in a shared space, the visual information on the tabletop poses challenges. Each digital asset that appears because of an object being placed on the table becomes part of the larger TTT frame. Multiple viewer-interactors who are next to each other and engage with the system will not have a "mine" and "yours" division of visual assets. The simultaneous information that is displayed creates a spatial montage that is part of everyone's perspective. Even information that is seen upside down plays into image association. This random presentation of images undermines procedural authorship although at times it could be interesting. However, in the long run, we run the risk of confusing the viewer-interactor.

screen real estate

The screen real estate is limited to the surface size of the TTT. Although tabletops are scalable, the larger the TTT the more a viewer-interactor will be unclear where the results of their actions will be displayed. Furthermore, as more material

objects are introduced and placed on the surface, the real estate decreases and limits where digital information can be presented. The material object and the digital information are now competing for space.

Designing Material Objects

Haptic cinema uses set dressing and propping as part of its narrative construction. These are typical areas that fall within the art department of a film production. Putting decorative items on the table for *CrazyQuilt Sightings* was equivalent to set dressing. Placing smaller object to use for navigation is equivalent to propping. Designers of haptic cinema must let viewer-interactors know which objects are part of the set (and should be not moved) and which are props (that can be used for navigation). One way to do this is to create psychological or physical barriers. The viewer-interactor will generally ignore an item that is not easily reachable because it is farther away. Items that are within reach and smaller than the items used for set dressing will signal to the user that they are to be handled and can be used for navigation.

Audience for haptic cinema using the TTT

Artists want to exhibit their work. Very few people will have an opportunity to see experience work on the TTT in the Synaesthetic Media Lab. I will no longer have access to this system to develop work post-graduation. Where will an audience have an opportunity to view my work? How can I continue to experiment with a TTT? Although some multichannel artists have created online versions of their work, haptic cinema requires the handling of material objects. Digital surrogates will not work for this genre.

Based on my first experience with the TTT, I have created the following chart, presented on the next page, which represents my challenges and the resulting solutions.

The following table represents the challenges posed by working on the TTT and my solutions.

Table 2: Tangible Tracking Table: Challenges and Solutions

	Challenge	Solution
1	TTT position and the moving image <ul style="list-style-type: none">Looking down on movies is awkward.	Present movies off the tabletop. Design for second display.
2	The Frame <ul style="list-style-type: none">Multiple assets displayed on TTT imply an association.	Design the association through procedural authorship.
3	Positioning digital assets for multiuser/simultaneous interaction <ul style="list-style-type: none">The digital information must face the participant so that it can be clearly read.If there are multiple viewer-interactors, the question arises, how to orient the information for multiple users who want access to the same information simultaneously.	Haptic cinema does not work for multiuser/simultaneous interaction on the TTT. Identify the orientation for a single user system.
4	Screen Real Estate <ul style="list-style-type: none">The material object and the digital information may be competing for space.Increasing the size of the TTT may make it unclear to viewer-interactor where the result of their actions will appear. It is also a problem for reach.	Increase real estate by displaying some of the digital information off the tabletop through multiple displays.
6	Designing Material Objects <ul style="list-style-type: none">Viewer-interactors must know which objects are part of set dressing and which are the equivalent of props that can be handled and used for navigation.	Create psychological engagement prior to interaction.
7	Audience for Haptic Cinema Using the TTT <ul style="list-style-type: none">Artists need to show their work.The TTT is large, heavy and not easily moved and location specific.Access will be limited post-graduation.People whose stories help to make up the narratives I construct should be able to see the work.A digital version of haptic cinema using the TTT is not possible because the reliance on material objects.	Design and build a portable tabletop.

The next two haptic cinema productions, *HER*, and *Making Beauty*, address the challenges encountered in the previous work using the TTT. For these projects I designed and had built a portable tangible tracking table (PTTT). The first project uses a cardboard design. The second project uses a fabricated tabletop made of pressed and treated foam core, a lightweight material that is durable and scratch resistant.

The project, *HER*, is a repurposing of my film of the same name, originally designed as a linear film. The second project, *Making Beauty*, was designed specifically for the tabletop. Both represent an unfolding of a filmic narrative through tangible object interaction.

The most significant change to haptic cinema at this juncture is the creation of spatial montage through multiple displays. Although the surface of the PTTT is significantly smaller, there are more options for image presentation.

5.4 HER: (2008-2009)

5.4.1 Overview

The moving image information for *HER* is from my twenty-minute science fiction film of the same name. Because the storyline is already segmented, it could be easily dissected and reorganization for use on the tabletop.

HER is the story of a female superhero known on her planet as THE KEEPER who is responsible for guarding the feminine energy force and patrolling the universe for threats to its existence. She has the ability to absorb the energy of what she witnesses into her body and re-project its imagery onto her skin or into the environment for others to see. When she learns that her planet is dying because of an evil force coming from Earth, she takes on the challenge to confront it.



Figure 5.19: Still image of The Keeper from the film *HER* by Ayoka Chenzira



**Figure 5.20: The Keeper looks down on Earth.
Still image from the film HER by Ayoka Chenzira**

The Keeper travels to Earth, transforming herself into a live action superhero ready to take on the challenge of saving her world. On earth, she discovers three nemeses, a minister, a music executive and a politician, whose misogynist practices are weakening female energy.

5.4.2 Physical design

The frame of the PTTT was constructed using two 23x23x23 cardboard boxes taped together, one on top of the other. The final dimensions for the frame were 23 inches wide by 40 inches high. A small section was cut out in the back of the bottom box to allow for ventilation and access to the equipment. Like the TTT, the system worked through rear-diffused illumination (DI). Inside of the frame were a camera with an IR filter, two IR lights, and a projector with an IR filter. Because the frame was relatively narrow, mirrors were not needed to enlarge the size of the projected imagery. The surface of the PTTT

was made from a piece of acrylic with light diffusing paper. A second projector was used to rear project video information onto a cutout of a 40"x60" female torso, which represented the main character.

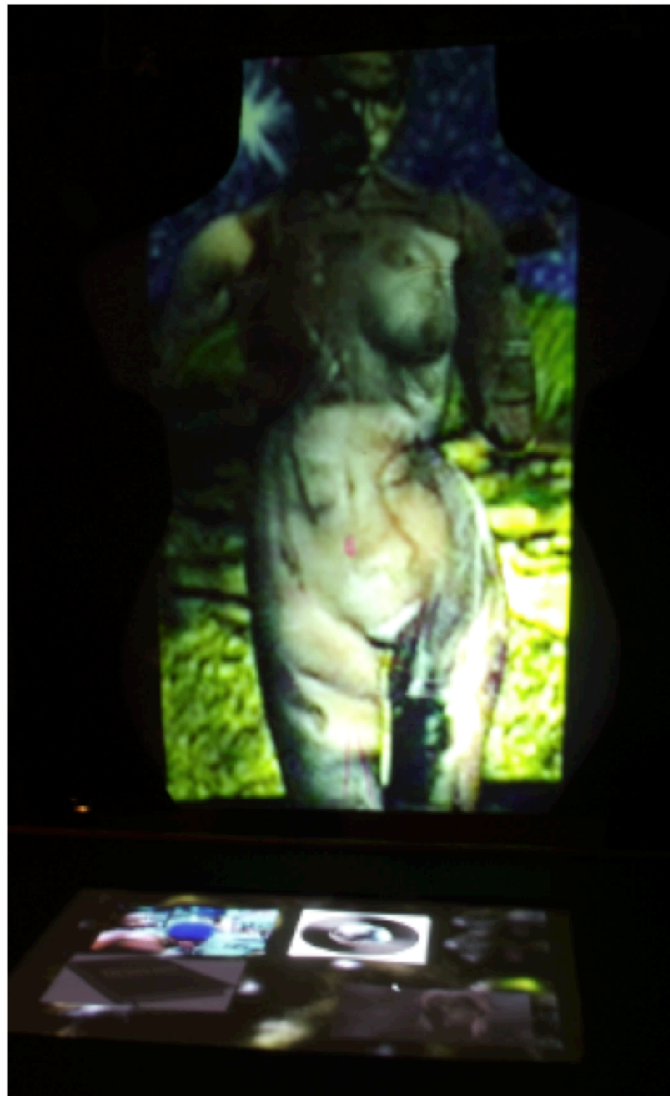


Figure 5.21: Image for *HER*. Depicted is the surface of a portable tabletop (PTTT) and a rear projected image of the main character.

5.4.3 Interaction Design

This project worked similarly to the previous project. Moving a physical object to a specific location on the tabletop surface called up its associated digital assets.

However, three things were significantly different:

1. Additional actions could be performed with the physical objects: *tapping*, *scratching*, and *sliding*.
2. The production made use of hand and fingertip interaction.

Actions with Objects

Three objects could be used to trigger various assets: a gavel, a bible and a record. A viewer-interactor could use the gavel to tap, flip through pages of the bible and perform DJ scratch using the record. If for example, the image of a record appeared on the PTTT surface, one could use the record to perform a scratch over the image to access the associated asset. In this case, a sequence of the music executive would appear on the second screen.



Figure 5.22: Image of record. Placing the record tool over the record and using the motion of a DJ scratch would trigger one of the sequences for the music executive.



Figure 5.23: The music executive.



Figure 5.24: Once the record is selected and the associated assets are displayed, the image of the record becomes grey as a way to signal that it cannot be selected again.

Interaction: hand and fingertip

When the viewer-interactor stood at the installation, on the surface of the PTTT they would see a loop of a character from another world with his hand raised. The hand pulsed to invite one to place their hand over his. If this were done, the user would enter the special world.

If the viewer-interactor was presented with a screen that had seven cards, they could touch a card and it would flip over to reveal another part of the narrative. A would be displayed through the second projector.



Figure 5.25: Placing a hand over the characters light-pulsing palm would enter a viewer-interactor into the story world.



Figure 5.26: View of the front of a card. When touched with a finger, the card will flip over to reveal an image. The action would trigger the associated video clip.



Figure 5.27: View of the back of the "tools of the trade" card.

Viewer-interactors could also touch text to trigger digital assets and resize photos by expanding and pinching.

The following figure shows the different layers of information that would appear as the viewer-interactor engaged with the system.



Figure 5.28 : This is an example of different screens that would appear as a viewer-interactor navigated through the montage. One frame represents the surface of the PTTT, the other represents the images from the second display projected onto the Keeper's body form. The numbers represent the number of actions associated with each layer. For example, the number 7 means that you can interact with the seven cards. In this example, you are seeing the front and back of the card. The number 3 means there are three actions that can be performed when presented with this screen.

5.4.4 Viewer Feedback

The installation was tested with two groups under different circumstances. The first group was specifically invited to engage with the system. They were comprised of twenty students from Georgia Tech who were generally familiar with touch screen and object tracking. This group was more interested in what they could do with the physical objects rather than the overall narrative. Their primary question was, "What do you do to win?"

Many were unfamiliar with the historical information that was woven throughout the narrative. For example, references to *Roe v. Wade*, the landmark Supreme Court decision that gave women the right to have an abortion, was unfamiliar to this group.

In the second presentation, fourteen people interacted with the system. The viewer-participants were part of a larger group that came to the Georgia Tech to see demonstrations in various labs. There was a broader representation of age and women made up two-thirds of the participants. None of the viewer-interactors had previous experience with object and finger tracking. This group needed more support to understand how they might use the objects. They were surprised to find that their use of the objects would provide filmed segments of the narrative. They were also surprised to learn that each time a different viewer-interactor engaged with the work the sequence of information appeared in a different order.

Both groups commented that they felt as though they were interacting with a movie. The overall takeaway was that the first group enjoyed figuring out the different interactions that were possible with the objects and their fines, but wanted a clear goal of

winning. The second group wanted fewer options for how to engage with the physical objects. They found switching between objects and finger tracking distracting.

5.4.5. Reflections

Viewer-interactors were more comfortable watching the moving image from a position that was more familiar to them. The smaller tabletop and the darkened room provided a more intimate environment where participants were more highly engaged. They had to choose which of the three object best matched digital information on the tabletop. The real time action of the participants and the screen time of the assets did not interrupt the engagement.

The primary challenge was that there were too many different types of actions to be performed with an object. Although the image and required action initially seemed well paired, they proved to be confusing. The first group understood that you could use the block with the record to perform "scratching" a technique used by DJ's to move a record back and forth. Group two was unaware of this technique and were confused even when they were guided through how to perform the action and heard the accompanying record scratching sound. Therefore, the action was not meaningful to them.

Productions with historical and cultural references need a clear context if they are to be shown to a "general audience." When I added more text to help viewer-interactors understand the historical references, the narrative became too text heavy. This posed a problem as people were spending more time reading than engaging with the material objects and the physical interaction.

The use of stand-in generic objects, even with representational photos, did not make

clear the relationship between the object and the unfolding narrative. The prototype still needed a better coupling between the objects and the rest of the narrative. The objects must be situated in the filmic narrative so that viewer-interactors have the "aha" moment. This is the moment when they realize and connect with the value of the object in the overall narrative.

Providing several types of interaction possibilities proved to be too much, turning the project into guessing game, which can be fun, but was out of synch with the serious content of this production. In prior experiments, the action had been simple, a one-to-one relationship. However, participants from the general population who were not tech-savvy students were actually more comfortable with this relationship although interactive designers frequently criticize it.

The cardboard PTTT proved to be an excellent choice. It was sturdy, and the right dimensions to accommodate a spatial montage on the surface with enough room for objects and images. The use of the second display also was a success. Moving images can be more spatialized but still specific enough so that the viewer-interactor will know that their actions will result in information appearing on a small tabletop surface of the larger screen.

I have decided that simplicity is in my best interest particularly if it makes clear what action should be performed, and gives the viewer-interactor time to understand how their actions are being reflected.

The narrative requires some time to digest. The second group wanted more time to reflect on what they had seen and to discuss it. This might suggest that in the future, I should consider a way for viewer-interactors to leave comments or questions that become

part of the narrative.

5.5 MAKING BEAUTY (2008 - ongoing)

One of the challenges to haptic cinema was the poor coupling between the objects and the story. Making Beauty addresses this. Based on the successful design of the cardboard tabletop, I designed and had fabricated a portable tracking table with a freestanding frame to support a 17" monitor.

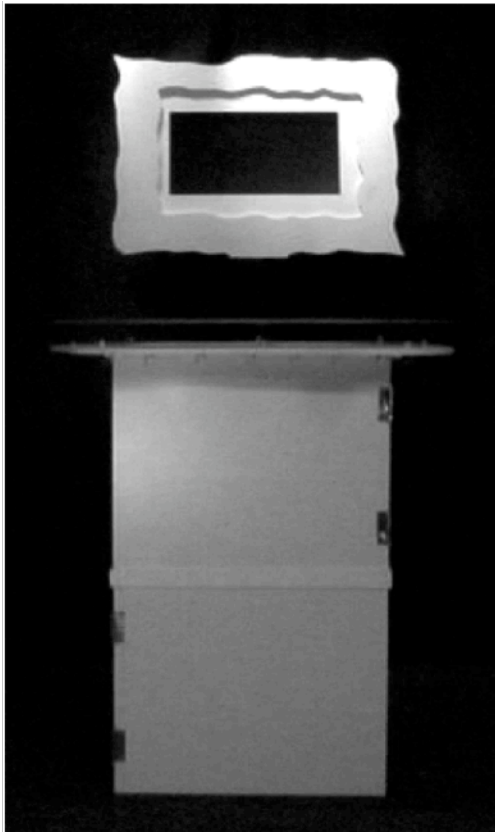


Figure 5.29: PTTT front view

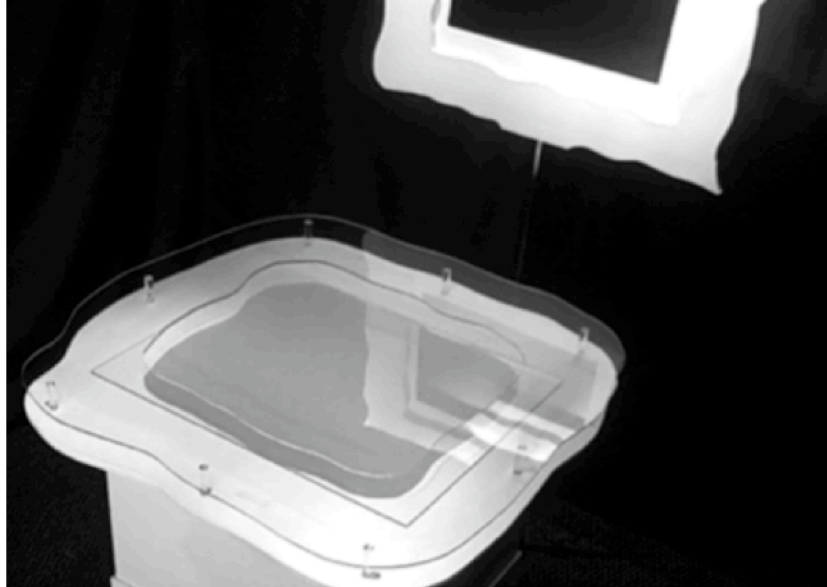


Figure 5.30: PTTT top view

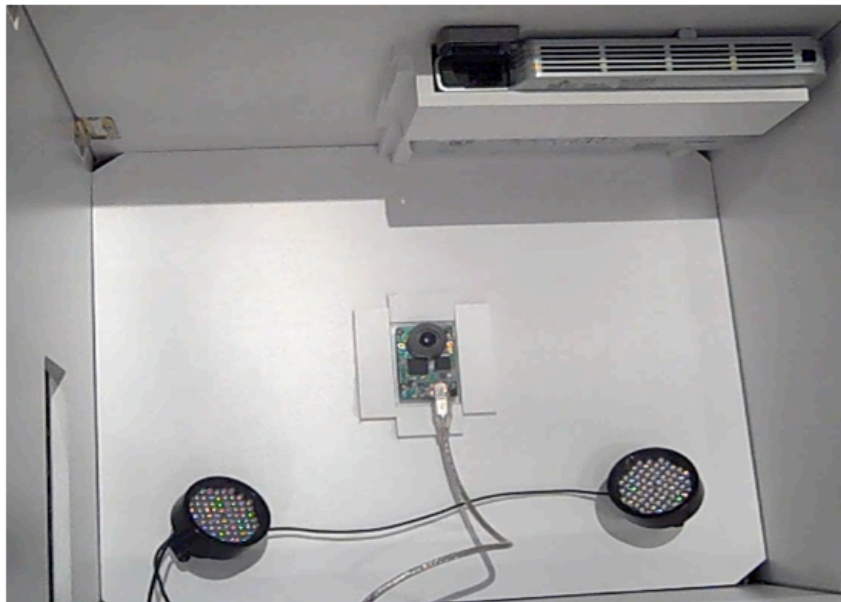


Figure 5.31: Interior of PTTT with a project, camera and two IR lights

5.5.1 Overview description

The project was a way to memorialize my mother who passed away unexpectedly in 2006. Initially, the project focused on the memories of six objects that she owned. Replicas were used. The objects had a lot to say about her, but I felt that the information was too "on the nose" an expression meaning too obvious and ordinary.



Figure 5.32: Objects used in the first iteration of *Making Beauty*

With a bit more distance from my loss, I began to design a work where image association, material objects, a multiple displays would be emphasized. As such, this project is a fuller representation of haptic cinema than previous the project, although it is incomplete. Currently, I am redesigning *Making Beauty* as a visual conversation, sometimes between my mother and her view of herself in the world through a lens of past, present and future presented simultaneously across multiple screens, and sometimes

as visual conversation between the two of us. By "visual conversation" I mean a way in which the communication is based primarily in imagery rather than in text or dialogue. In this way, image association is emphasized. Despite considerable work on the first iteration, the project is still in its infancy. I feel obligated to get it right. The project will need funding to be fully realized.

5.5.2 Physical Design

First Iteration



Figure 5.33: Early stage of physical design



Figure 5.34: Professor Vinicius Navarro navigating the early prototype for *Making Beauty* while Ayoka Chenzira responds to his questions.



Figure 5.35: PTTT dressed as a woman's vanity table for the production *Making Beauty*, first iteration.

The PTTT is dressed to look like a woman's vanity table with personal objects around its edges. Six objects are used to unfold the filmic narrative: a perfume bottle, the statue of a nun, a broach, a \$2 bill, a pincushion, and a seashell. Each is an object that is embedded with knowledge that will be released through interaction. A frame supported by an adjustable stand is positioned behind the tabletop.



Figure 5.36: Additional view of the PTTT for *Making Beauty*, first iteration



Figure 5.37: Aerial view of the PTTT for *Making Beauty*, first iteration

Second Iteration

Here the tabletop remains the same, but information is displayed through four displays: the tabletop projector and three additional projectors.

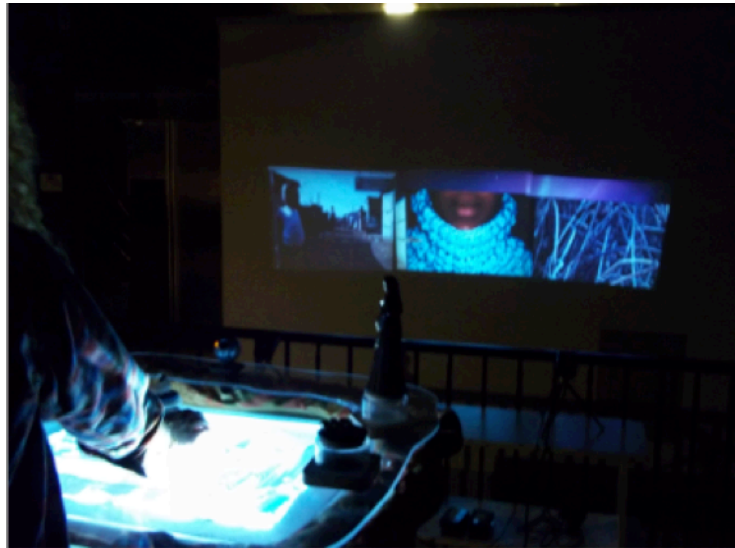


Figure 5.38: PTT with 4 projections -- one on the tabletop and three displaying imagery on a wall. Second iteration



Figure 5.39: Viewer-interactor with perfume bottle and four displays, 2nd iteration



Figure 5.40: Viewer interactor with PTTT *Making Beauty*

5.5.3 Technical Design

On the table is a collage of photographs of my mother at various points in her life. Viewers are to consider which object best belongs with which picture. If the coupling is correct, a digital version of the object moves up from the tabletop into its rightful position within the images that are projected onto a wall. Associated assets are revealed across three projected frames

Each object is tagged with a marker and when sensed, triggers audiovisual information to be presented through three of the displays.

Since the narrative moves between the past, present and future, it needed a design to support this structure. The current design uses three palm-size projectors that can support images up to eighty inches. With the projector inside of the tabletop, a total of

four projectors are used. Two Matrox DualHead2Go units support the use of multiple monitors. Assets can appear within a single frame, across two frames or all three frames. This design builds on the earlier projection art discussed in chapter two, Expanded Cinema. Video, audio and text are prepared in Final Cut and exported as QuickTime videos. The programming was done Max/MSP/JITTER.

Each of the six objects has three associated sets of assets that are structured into three themes. Once an asset has been displayed, it will not be revealed within the same session. The presentations of the assets range from fifteen seconds to one minute. The total running time of the audiovisual information is seven minutes.

5.5.4 Interaction

When a viewer-interactor stands at the *Making Beauty* production the camera detects their presence and triggers the Welcome Screen. They will see a collection of



Figure 5.41: Home screen collage on tabletop for *Making Beauty*



Figure 5.42: Hand placing brooch over correct image.



Figure 5.43: Digital version of brooch appears and moves off PTTT to second screen.



Figure 5.32: Associated asset is displayed.

a collage constructed from images of my mother during different times in her life on the PTTT surface. Each object belongs with a photograph. If an object is properly positioned with its corresponding photo, a digital version of the object will appear on the PTTT and travel up to the top of the tabletop where it will leave and enter a second version of the collage that is displayed through a second display. For example, if the broach is placed on the shirt of my mother standing with her bicycle (as seen in figure 5.31), a digital version of the broach will appear on the PTTT surface and move up to the second screen where it will take its position on my mother's shirt. Then, the associated video will play.

In the second version of the production, different event streams are displayed across three screens.

5.5.5 Viewer Feedback

Viewer-interactors who have engaged with the project commented that they enjoyed handling the material objects and figuring out where they should go. They liked that the digital object could move from one screen to another. The later made the work feel more connected. The small number of objects suggested that there was a beginning and end, and that there would be a finite set of corresponding digital content.

5.5.6. Reflections

This project represents the first documented use of simultaneous multiple projections with the tabletop and where digital objects moved across multiple frames. It also, for the first time decorates the physical structure to create a stronger connection

between the hardware support and the narrative. In this project, the tabletop becomes more than a physical support, it becomes an object in the story, a woman's vanity table with various objects (implied as having belonged to the woman).

This project is still in production. Funding is needed to support the creation of original material. Currently, online media is serving as placeholders for most scenes and needs to be replaced with original footage to complete the project. Still, viewers were very engaged. I wanted to avoid text that described how the system works. Two of the objects are paired with photos that seem obvious; the nun goes with a photo where nuns are standing and the seashell goes with my mother on the beach. The others require more thought. Viewer-interactors have been engaged enough to ultimately make the associations.

Writing for the tabletop with multiple screen projection is a new skill and one that I intend to further develop. What is important to consider is not just how I personally make associations, but how to transfer my organization of material to a broader group.

CHAPTER 6

CONCLUSION AND FUTURE DIRECTION

I entered the Georgia Institute of Technology with an interest in discovering how I might use technology to support my work with the moving image. To this end, I have created a new art practice called *haptic cinema*. As described in this dissertation, the practice is rooted in and builds on expanded cinema practices of the 1960s and 1970s, interactive cinema, tangible narratives and tabletop computing. It is not for everyone, but it does have tremendous potential. Haptic cinema is an artisanal art practice. The artist designs the visual content, the interaction and how the visual and audio information will be displayed. The practice is demanding, particularly when using the portable tabletop. An artist working on a portable tabletop will need to recalibrate the system each time it is moved and connect all of the associated adapters, which can be considerable depending on the computer that is used and the number of displays. There is also the challenge of light. Working on the tabletop, regardless of size, requires a consideration of three different types of light: sunlight, fluorescent light, and infrared light. Because there is projection on the tabletop surface, and there can be multiple displays in a room, the best environment for haptic cinema is in spaces with little or no sunlight or artificial light as this can interfere with projection.

Another challenge for the haptic cinema artist is how best to create a system that can operate independent of the artist. During each of my experiments, I was present as viewer-interactors engaged with the system. Based on their questions and how I saw them navigate, I added onscreen text to assist with understanding how the system worked. Additionally, I created the "first choice" object. This object is obviously paired

with a particular image that is reflected on the surface of the table. When a viewer-interactor makes the first choice object their first selection, they quickly understand how the art piece works.

Haptic cinema requires the viewer-interactor to be present in a physical space. As such, online digital versions of haptic cinema cannot be successfully constructed since a digital surrogate cannot replace the material objects. A digital object can serve as a guardian to visual and audio information, but what will be lost is the required handling of material objects and deciding how they fit into the spatial montage. The materiality makes a difference. The object of the nun is different than the object of the pincushion. It through my understanding of how the associations between the physical object and the digital information work, that I am scripting the interaction.

Each piece of interactive art is different. There is not a not a generic platform that will make it work for everyone. For each work, you have to carefully design for story, content and object. They are interlinked. You cannot use a generic push button link for haptic cinema as all of the elements of the narrative are tied together to a larger physical structure.

Now that I have identified the form to support my work, my immediate future work in haptic cinema will support my practice of constructing narratives based on oral narratives of personal experience, particularly from communities that are considered marginalized. Their experiences often provide an alternative history that is not considered by industrialized cinema, which along with text, is considered the official authenticator of history. Oral narratives of personal experience present another way of “knowing” about being in the world. They are more than a reflection about an event.

They are an oral tradition of theorizing and have long served as the custodians for historical, cultural, personal and popular memory.

In considering oral narratives for haptic cinema, I connect one of the oldest forms of communication, the spoken word, with a new form of communication as expressed through haptic cinema. Viewer-interactors will have an opportunity to engage with narratives that they might not have considered. Although I am still in the early stages of experimentation, there is a clear road ahead. My next work is an oral narrative project involving women who have been displaced because of war. Each has identified objects that they will use to construct their memories. The objects range from small fragments to organic materials such as tears and a live horse. Working on this project will no doubt advance haptic cinema, which currently has not taken into account the tracking of large objects, or living beings. I do however suggest that my initial process serves as practical and conceptual support for artists and other researchers interested in the further study of haptic cinema.

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VITA

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Ayoka Chenzira is a filmmaker, digital media artist and a Professor of Film at Spelman College. She is a graduate of New York University (B.F.A. in Film) and Columbia University/Teachers College (Ed.M).

Chenzira created numerous award-winning films that span fiction, animation, documentary, and experimental narratives and is one of the first African American women to write, produce and direct a 35mm feature film, *Alma's Rainbow*. Her films appeared on American and European television in addition to being screened at numerous festivals in the U.S. and at international festivals from Brazil to Egypt. Several of her films have been translated into other languages and are in permanent collections including the Museum of Modern Art in New York. She has lectured on her interactive digital media productions in the U.S., Singapore, and Turkey.

In addition to her work as an artist, Chenzira is an educator. She co-created the M.F.A. in Media Arts Production at the City College of New York where she was a faculty member for many years. She also taught filmmaking in Sub-Saharan Africa and lectured in Bahrain at the request of the U.S. State Department. In 2001, Spelman College invited her to serve as its first William and Camille Cosby Endowed Professor in the Arts. She later joined the faculty and became the founding director of the Digital Moving Image Salon (DMIS), which produces narratives for digital platforms. Apple Computer awarded her a Distinguished Educator Award for her work with storytelling and digital technology. She also was awarded a Sony Innovators Award. In 2010, Spelman College's Women's Research and Resource Center produced a documentary about her work. Chenzira resides in Atlanta with her husband, Tim Richardson.