

**A TREATISE ON THE LOOP AS A DESIRED FORM:
VISUAL FEEDBACK & RELATIONAL NEW MEDIA**

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**A TREATISE ON THE LOOP AS A DESIRED FORM:
VISUAL FEEDBACK & RELATIONAL NEW MEDIA**

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To Sarah:

*A veces me gusta perder;
otras veces, ganar.*

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SUMMARY

The visual feedback loop has long-been ignored as a form and an aesthetic within new media. Media theories have largely assumed a medium is defined by the material technology, relegating visual feedback to a circumstance of media rather than a unique and well-defined concept. This thesis sets forth a criteria for characterizing the visual feedback loop as a desired form, that is, a distinct set of formal and phenomenological qualities that are independent of a medium. Grounding the criteria are the cinema theories of Gilles Deleuze and Sean Cubitt; these theories propose that the cinematic image relates visual forms to generate information in decoding rather represents information directly. The thesis elaborates the theoretical concepts in examples of visual feedback loops from video (Nam June Paik's *TV Buddha*, Bruce Nauman's *Live Taped Video Corridor*), new media art (Daniel Rozin's physical mirrors), and digital technologies (GPS navigation systems). To reconcile the visual feedback loop within media theories, the thesis calls for a radical change in how theorists define a medium. Moving away from notions of inscription and materiality, media now rely on a collapsed distinction between sender and receiver. Hence, visual feedback loops exist as remediations of a conceptual framework rather than a technological one, and so require a logic within media theory that allow for the rise of other desired forms like the visual feedback loop.

PROLOGUE:

SIMULATIONS OF MEDIA

In past eras, a medium has been interchangeable with its technology; the material and the concept formed a tautology. The conventions of naming media speak to this legacy. Cinema is called film; the term *newspaper* refers to an individual publication and the entire publishing pipeline; the radio, as a device, serves as metonymy for the eponymous medium.¹

Defining a medium, however, has become difficult. Digital technologies introduce ambiguity by blurring the criteria for and execution of a medium. Cinema no longer requires film, as evidenced by *Inland Empire* by David Lynch. Newspapers no longer publish papers, but disseminate information (what many refer to as content). Radio, as a medium, no longer requires radio sets (or even radio waves!) in the case of internet broadcasts and satellite radio. A medium has moved away from the its once (if ever) materiality; media now require less literal and prescriptive definitions.

In *Remediation*, Jay Bolter and Richard Grusin define a medium as "that which remediates", claiming that the digital medium is defined through its comprehensive ability to represent other media.² In *The Language of New Media*, Lev Manovich defines new media through five functional characteristics: numerical representation, modularity, automation, variability, and transcoding.³ In *Hamlet on the Holodeck*, Janet Murray

¹ For example, when one says "I'm listening to the radio" (the device), they saying "I'm listening to Radio." (the medium). Quizzically, the English language does not accommodate this duality as it does for television. Watching the television is equivalent to watching television (more properly, Television).

² Jay David Bolter and Richard Grusin. *Remediation: Understanding New Media*. Cambridge: The MIT Press, 1999.65.

³ Lev Manovich. *The Language of New Media*. (Cambridge: The MIT Press, 2001.), 27.

defines the digital medium by identifying its four affordances: procedural, participatory, spatial, and encyclopedic.⁴ All of these definitions unbind the digital medium from its materiality; in doing so, these definitions make a medium into a structural concept. The definition is a scaffold, a wireframe, a set of components, and an abstraction.

Accordingly, the same principle retroactively redefines media. To preserve the distinctions amongst media and across remediations of media (remedia?), media theorists have moved toward higher level analysis. Manovich is most explicit about this, claiming that "[c]inema [...] was the original modern 'multimedia'" as it realizes his breed of characteristics without the computer.⁵

While these definitions grant media flexibility—a flexibility that has, in actuality, always been there in the definition of a medium's expression—they inherit one particularly rigid aspect from the ontology of their ancestors. In each definition, the medium is defined in and through encoding. Bolter and Grusin, Manovich, and Murray presuppose the distinction amongst media arises in the processes of encoding, inscription, and transmission. For example, cinema and video, in a material sense, differ in how they separate recording and viewing—film is developed; video is not. As newer technology breaks material constraints, the separation is not a material distinction. Instead, temporal partitions abstract into distributions of power—video production is democratic; cinema production is not. In both cases, media bracket out the receiver (though maybe not the apparatus of reception), presuming a universality of reception; the medium signifies an *a priori* abstraction.

For the most part this is ontology holds true; encoding does uniquely determine the vast majority of media forms. While cinema cannot be said to come from the substrate of film,

⁴ Janet Murray. *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. (Cambridge: The MIT Press, 1997.), 87.

⁵Manovich, *The Language of New Media*, 67.

it does rely on certain conventions of encoding—the "dynamic" screen,⁶ the cut, synchronized sound, etc. On certain boundaries, the ontology reveals a non-uniqueness of form.

The purpose of this writing is to explore one of these boundary forms—the visual feedback loop—as both a case study and a symptom of a general theory. The visual feedback loop exposes specific failures of media theory through its previous inadequate articulation. The majority of my effort will be spent developing a theory particular to visual feedback. By outlining a parallel theoretical discourse from cinema, the dilemma plaguing visual feedback loops becomes clear. Since the argument in cinema comes from a fundamental difference in reading the moving image, the theory of visual feedback is limited to concepts of space and subjectivity. There are, of course, unexplored avenues, such as time and sound, which will not be explored here.

A series of case studies will elaborate the theory. These cases highlight core tensions—practicality versus expressiveness, distributions of power, constructions of space, etc. As is always the case, there are numerous examples that will not be covered; the chosen artifacts most explicitly illustrate the breadth and depth of these tensions, as well as expose the ambiguous boundary of media theory.

The last chapter aims outward; it presupposes that the specific need for a theory of visual feedback stems from the systematic ontological failures of existing theories. Simply, the visual feedback loop forces one to rethink the role of the receiver and reception in the definition of a medium. Accordingly, the specific updates to media theory rely on a new definition of media to privilege the processes of decoding and reception.

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⁶Manovich, *The Language of New Media*, 96.

The argument here calls for the adoption of media theories that identify expressive forms as opposed to expressed encodings. The visual feedback loop, as one such form, provides the first example of how to structure new theories of new media that move further from legacy notions. The acceptance and inclusion of such a form requires one to accept the notion that media are diverging (or at least subdividing) rapidly. The digital medium, as a result, has the potential (and already has) to birth new media exclusive which are exclusively digital, yet resist absorption in the digital medium itself. This final point comes from the concept of the desired form.

CHAPTER 2:

TOWARD THE DESIRED FORM

2.1: The failure of inward-looking

Visual feedback has a sorted heritage; it is not a technology, nor a medium (at least in the classical sense), nor purely a use of technology. Partially, visual feedback garners comparison to video, which, as a technology and a medium, suffers from its own identity confusion—video relies on metaphors of perspective and time that trace back to film and television. Partially, it garners comparisons to digital technologies in how it grants the physical body a virtual representation reflectively and reflexively.^{1,2} Likewise, to call the visual feedback loop simply a structure foists it into the realm of material situations and situational materials; aesthetics are ostensibly lost. As a result, theorists cushion media theory from visual feedback and the visual feedback loop—they are side effects, oddities, special cases, or anomalies of visual media.

When the generic feedback loop enters into a discussion, the product dominates. For example, Lev Manovich states that the various forms of cellphone feedback foster interaction in order to produce the interaction itself, ostensibly making feedback invisible.³ In another example, Rosalind Krauss claims that video feedback panders to narcissism by directly representing the "ego-libido", thereby producing a visible

¹ These terms as tenets of digital media stem from their introduction as concepts in the early cybernetics conferences; , N. Katherine Hayles. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. (Chicago: The University of Chicago Press, 1999.), 9.

² Despite being similar in their definitions, reflection and reflexivity are completely different ideas. In mathematical terms, the former is an affine transformation; a reflection preserves relative relationships—such as scale and connectedness—while changing the absolute relationships of points. That is to say, reflected forms are similar, yet different in an important way. Reflexivity is a property of complete similarity. A reflexive relationship is a tautology. Where reflection is outward and binary—a form that is uncanny in resemblance to another—reflexivity is inward and unitary—a form that is literally and figuratively the same as a another. Logically, reflection deals with tokens—instances of a single type—while reflexivity deals with a single token.

³ Lev Manovich. "Information as an Aesthetic Event." (Massachusetts Institute of Technology, 2007.)

psychological state.⁴ In this logic, the feedback loop—and, by extension, the visual feedback loop—is essentialized: the product comes from a circumstantial media form. The form exposes a circumstance of the technology rather than a circumstance of the form itself.

In visual media, this logic of essentialization has a single end: analysis identifies the image and denies the image-making. For instance, cinema is often essentialized as that which is profilmic—to speak of a film is to speak of what is *seen*. In exchange, the cinematic spectator and the cinematic apparatus are excluded from the equation. When the forms and processes *are* exposed, they expose a phenomenology *toward* the image and not a phenomenology *of* the image.⁵

Following this argument, images—whether cinematic, photographic, or otherwise—become vessels. Hence, the framed space bears comprehension in that the framed space contains all representation. As a result, the image-as-vessel engenders a particular mode of looking to reconcile the logic of an image with the opaqueness of its illusion. This mode, I call, inward-looking. Inward-looking privileges what an image shows, and inherently presupposes an image has something to show. Furthermore, inward-looking presupposes that mediation is a characteristic of information and not of representation; to see something *in* an image is to extract suspended information *from* a medium.

In this mode, what an image shows is precisely what an image means. Comprehension comes out of the image (as-vessel); the image-itself simply stages comprehension. The interpretation qua meaning rests below the material image plane. The state of being an

⁴ Rosalind Krauss. "Video: The Aesthetics of Narcissism." (*October* 1, no. Spring (1976): 50-64.), 57.

⁵ In the case of Structural film, where the forms and processes constitute the profilmic, exposure deceitfully conceals even further.

image (the Deleuze-via-Schwab term "imagehood"⁶) becomes exchangeable with the state of being a perspective, that is, subjecthood. Here, subjectivity engineers comprehension by structuring the visibility of objects.⁷

Rudolph Arnheim provides a discursive example of how the collapse of representation occurs. In discussing visual rhetoric, he distinguishes “between three functions performed by images”, that is, “picture, symbol, sign”.⁸ Deftly, Arnheim explains,

“The three terms [...] do not stand for kinds of images. They rather describe three functions *fulfilled* by images. A particular image may be used for each of these functions and will often serve more than one at the same time. As a rule, the image itself does not tell which function is intended.”⁹

In theory, there is a separation between representation and function. Arnheim explains that the functions traverse a dual-gradient. Signs exhibit no abstraction,¹⁰ while maintaining a diverse and complex meaning. The ambiguity can be positive—as in the intentional invocation of multiple meanings in visual poetry—or negative—as in unintentional multiple meanings in new road signage. Pictures express a low level of abstraction (pictures depict select inborn qualities¹¹), and so cut off certain associations or alternate definitions. Symbols formulate a high level of abstraction (symbols inscribe or encode concepts¹²), and embed a more rigid semiotic structure onto the denotative and

⁶ Martin Schwab. "Escape from the Image: Deleuze's Image-Ontology." In *The Brain Is the Screen: Deleuze and the Philosophy of Cinema*, edited by Gregory Flaxman, 109-39. (Minneapolis: University of Minnesota Press, 2000.), 110.

⁷ This is one of most obvious fallacies of inward-looking. Imagehood and subjectivity are orthogonal. To equate the two compresses divergent axes and warps one's assumptions about images.

⁸ Rudolph Arnheim. “Pictures, Symbols, and Signs.” In *Visual Rhetoric in a Digital World: A Critical Sourcebook*, edited by Carolyn Handa, 137-51. (New York: Bedford/St. Martin's, 2004.), 137.

⁹ Arnheim, 137.; emphasis added

¹⁰ "An image serves as a sign to the extent to which it stands for a particular content without reflecting its characteristics visually."; Arnheim, 137-38.

¹¹ Arnheim, 138.

¹² Arnheim, 138.

connotative components. Where signs and pictures exist in a tight coupling with their definition, symbols move beyond definitions to imply loftier metaphors.

The problem arises when the function stands for the inner-relationship of visible objects. Visibility qua image-as-vessel determines comprehension (and so visibility) in that the image transmits iconized information, viz. (acts as a) medium. Functional significance reduces the image to its ability to contain icons, and so the icons are reduced to their information. The image, then, contains nothing more than its functional content, which in turn only contains information. Martin Schwab explains it as follows:

“In general, we think of images in semiotic terms. Images are signs or, more precisely, signs that present their meanings in an iconic mode, traditionally understood as representation via similarity or resemblance. What a picture or image shows us, it does by presenting us with a structural analogue (it re-presents something).”¹³

Inward-looking re-presents information by way of two layers: the icon as transferable information and the image as a collection of transferable icons. As a visible stage, the image-as-vessel suspends and cultures icons, and exterminates itself in the process. The image acts fills the role of wax tablet—information necessitates a substance for inscription.

Important here is that by image, I do not mean still image. Instead, I mean “some visual form.” Just as the imageness is negated, so too is the specifics of the image format. The image of dog in cinema versus the image of a dog in photography should (and, in fact do) present radically different understandings of what the dog denotes and connotes. Inward-looking, on the other hand, asserts the same expression of a dog can be captured within *any* medium. Any difference arises from if information is lost during encoding (where a

¹³ Schwab, 110.

defined set of information antecedes encoded information). The burden and failure falls on the encoder, not on the medium nor on the information, nor on the recipient.

While it does command a certain amount of attention, inward-looking fails to translate medium-specifics to differences in meaning. Its main failure stems from the seclusion of the image. For photography, the image exists as a solitary unit. The roll in which the photograph exists does not necessarily correlate the content of one image to the content of another. The current photograph has no bearing on the subsequent photograph, and takes no cues from the previous one. The photographic image is non-relational; the cinematic image, however, is.

The cinematic image results from a shift from image as static to image as dynamic. The dynamic image (called the "dynamic screen" by Lev Manovich) is defined as an image that "can display an image changing over time."¹⁴ At the material level, the dynamic cinematic screen is nothing more slightly differentiated static images. However, the dynamic image represents an entirely different palette. Where the photographic image asserts autonomy—disjoint from time and space, it captures objects—the cinematic image relates in time and space. The cinematic image captures *perceptions* of objects within images as objects.

The purpose of this chapter is to establish an argument for how and why visual feedback loop is relational. The first goal is to pinpoint the failings of essentializing cinema as purely inward-looking by understanding Deleuze's ontological and phenomenological conditions for the image; the second goal is to identify the two main relations of image-objects and how they construct information. The third goal is to correlate the phenomenological concerns of Deleuze with the formal concerns of Sean Cubitt. The

¹⁴ Manovich, *The Language of New Media*, 96.

final goal is to use Deleuze and Cubitt to construct a more comprehensive ontology and theory of the visual feedback loop as a relational whole.

2.2: Image phenomenology

To understand why and how Gilles Deleuze provides such an important touchstone for understanding the feedback loop, one must compare the presuppositions of Deleuzian and non-Deleuzian cinema. In brief, the Deleuzian model for cinema posits that cinematic images act as objects; Deleuze calls these *image-objects*. Image-objects, just as physical objects, express their function through functioning. Cinema is comprehensible through what the image-objects do within the moving picture rather than what they represent. Image-objects gather meaning through a physics of causality, and it is the physics—inborn properties and exterior interactions—that transform visibility into visuality. The cinematic image, one can say, produces information that does not inhere in the representation. Hence, the moving image exists as inwardly (re)presentational and outwardly informational.

As mentioned before, a great deal of film theory has been devoted to semiotic and representational models. These theories differ quite a lot, yet abide the same founding assumptions. These models derive meaning from cinema in the same fashion that they derive meaning from any system. Instead of the cinematic image being a unique (non-linguistic) phenomenon, it is a collection of iconic elements serving as a synecdoche for a deeper meaning. This implies three things:

- (1) Images are comprehensible in as much as images contain comprehensible icons (i.e. images-as-vessel).
- (2) Images rely on arbitrary (non-semantic) boundaries.
- (3) Images are meaningful in as much as the icons are previously determined as meaningful.

The first of these has been previously discussed as denying the specificity of a medium. Inward-looking trains the eye on the interior space of an image.¹ In a way, the image is transparent and the illusion of the image is opaque. The image is looked through and the representations contained within the image are perceived directly. The image (or screen) behaves like a window, behind which the viewer resides. The image, like the window, partitions a whole space; that is, the image space is a portion of lived space. This leads to the second implication.

The arbitrary boundary presents a paradox for cinema. Although the image-as-window forms how we understand the world beyond the frame, it asserts that the contents are only a slice, albeit a selective slice, of the world on the other side. Moreover, that world is, in fact, the spectator's world. The spectator relates to the window-like image as if the perspective is personal; that is, the image denies its own subjectivity when un-viewed. This paradox results from inward-looking as much as from the movement of the image. In cinema, the frame (truly the camera's eye) does not appear to arrest time and space, but present it. The verisimilitude of the cinematic space to actual space denotes continuity—not only does a world exist beyond the frame, but it exists concurrently with the bounded space-time. As the material and immaterial manifestation of the present subject (a spectator), the boundary of the image denies meaningfulness or intentionality; this is due to fact that it is a circumstance of viewing and not, as logic suppose, a circumstance of transmission. The boundary, however, is both forgotten and used by inward-looking; respectively, the boundaries are one- and two-sided. The one-sided boundary denies the world just beyond the image while abolishing itself. The two-sided boundary partitions

¹ Again, by image I mean *any-image-whatsoever*, as these modes of thought do not precisely distinguish looking at a still image from looking at a moving image.

the cinematic world into framed and unframed. The latter requires that perspective and subjectivity exist in the image itself. The totality of existence beyond the strictures of cinematic sight (what Andre Bazin calls "the myth of total cinema"²) does not restrict icons to the visible image. Inward-looking, on the other hand, denies the world around the cinematic image as soon as icons determine comprehension; anything not acting as an icon—here, the non-existent unframed world—cannot contribute to meaning or comprehension.³

The first and second implication lead, finally, to a third generalizable concept of inward-looking: comprehension of the inscribed icons is based on definitional ascription. Icons specify meaning, as Rudolph Arnheim explains, by oscillating between abstraction and specificity.⁴ In order for this oscillation to occur, definitions have to exist prior the icons; that is, icons visualize definitions and definitional ambiguity. The icon, though more flexible than the definition, ultimately orbits an isolated concept. Such interpretive logic "reduces the cinematic image to an utterance, and its essential characteristic, its motion, is left out of consideration."⁵ The reduction is two-fold: the icon-as-utterable and the comprehension-as-utterance. The former—the utterable icon—becomes linguistic, representative only as a syntagm. As comprised of icons, the latter formulates a higher-order paradigm. The syntagm-paradigm duality drives comprehension by visualizing

² Angelo Restivo. "Into the Breach: Between the Movement-Image and the Time-Image." In *The Brain Is the Screen: Deleuze and the Philosophy of Cinema*, edited by Gregory Flaxman, 171-93. (Minneapolis: University of Minnesota Press, 2000.), 176.

³ It can certainly be argued this over-simplifies semiotics since even icons exist in a dialogical fashion. As true as that may be, the over-simplification offers the same consequence as the complex one: semiotics iconizes moving images, and, as a result, treats the images a statically and absolutely related.

⁴ Arnheim, 137-38.

⁵ Deleuze, Gilles. *Negotiations, 1972-1990*. Translated by Martin Joughin. (New York: Columbia University Press, 1990.), 59.

definitions. Icons and utterances composite the moving image as letters composite words and words composite paragraphs. In this way, the executed meaning overrides the execution of meaning.

⇔

For the purposes here, two concepts will be borrowed from Deleuze:

- (1) The relational structure of cinema (*imagehood* and *image-object*)
- (2) The relations of space and time in cinema
 - (a) outward space-time (*movement-image*)
 - (b) inward space-time (*time-image*)

Later, these will be utilized to explain the visual feedback loop. Partially, Deleuze contributes the notion that the physical self and virtual self relate through perceptual (internal) and physical (external) associations. Additionally, Deleuze outlines these affiliations as being generative—the physical and virtual self are not information, but informational. Lastly, Deleuze offers how contiguity forms visual continuity; visual feedback reverse this process.

⇔

/Imagehood

Gilles Deleuze understands cinema as a unique physics, exhibiting its own relationships, interactions, and experiences.

“[Deleuzian image-ontology] is not an ontology of semiosis or signification, but a general ontology of the universe—the universe of images. Being—being itself, without further qualification—is conceived as imagehood; all being is ‘image-being’ and/or ‘being-image.’ [...] The most general imagistic trait is to be a dynamic kind of relation or relatedness”.⁶

⁶ Schwab, 110.

Where the image serves as a vessel in semiotics, the image in the Deleuzian universe serves as an atomic particle. The former subdivides the cinematic image; the image is Cartesian—gridded and systematic, it is sterilized from movement in order for icons to occupy it (viz. be inscribed). The Deleuzian image—the image-object—depends on the moving image as modulating ("the whole that changes"⁷). The image-object is flexible and fluid (as space is for Leibniz; see section 3.2)—it, and not what it contains, changes. Deleuze states "modulation is the operation of the Real, in so far as it constitutes and never stops reconstituting the identity of image and object."⁸

The modulating image-object is similar to a vertex. The existence of a vertex (at least in a meaningful way) depends on the existence of edges (line segments connecting vertices). Likewise, the image-object automatically defines other image-objects once brought into existence through interconnections, i.e. relations. As much as the relations can be literal sequences of images, they can also be implied. For example, the visible image (*on-screen*) denotes a non-visible image (*off-screen*). The relationship between image-objects inform the spectator and image-objects themselves are informational in so far as they enable relations. Vivian Sobchack explains that:

"What is analyzed by some as a series of discrete incremental photographic 'moments' passing themselves off in expression as real movement is real movement. These 'moments' achieve real movement though the film's existential activity. That is, they temporally come into being as they are introceptively perceived through the camera and visibly expressed through the projector. [...] [T]hey radically resolve themselves into

⁷ Gilles Deleuze. *Cinema 2: The Time-Image*. Translated by Hugh Tomlinson and Robert Galeta. (Minneapolis: University of Minnesota Press, 1989.), 35.

⁸ Deleuze, *Cinema 2: The Time-Image*, 28.

analog fluidity of intentional action [...] [T]his commutation of the photographic into the cinematic inscribes a very real and intentionally directed 'momentum.'"⁹

Sobchack's momentum is Deleuze's relation. Image-objects enable causality, and cinematic comprehension is a building of *in-betweens*. Semiotics tried to tackle this abstract notion by applying the syntagm-paradigm structure (image/icon-as-signifier→signified). The failing of cinematic semiotics is that the signified is not what is comprehended as meaning or meaningful. Instead, the process of signification (symbolically: →) is what one comprehends. The confusion is that this metamorphosis is always indirect; it is presented in, on, and through images; semiotics muddles the symptom and the cause.

Important to image-objects as related is that they relate bidirectionally¹⁰ (symbolically: ↔):

“To be an image is thus to be a form of exchange or interaction—action and reaction—between something and its environment, and to have or to constitute being and determinacy as such a form. Exchange operates in both directions, from the environment toward the image, from the image toward its environment. Images are (by) being in exchange with the milieu—a milieu that is, of course, imagistic. Effectuating exchanges take place both across and beyond the boundaries of a particular image, for exchanges always take place in more comprehensive webs relating a plurality of images. Indeed, all movement-images interact all the time with all the other images, and there are no nonimages [*sic*].”¹¹

⁹ Vivian Sobchack. *The Address of the Eye: A Phenomenology of Film Experience*. (Princeton: The Princeton University Press, 1992.), 208.

¹⁰ Bidirectionality as a properties of images is a dramatic shift from semiotics which specifies a unidirectional process of meaning making.

¹¹ Schwab, 111-12.

In each direction, two distinct stages occur: differentiation and specification.

Differentiation "expresses a whole which changes, and becomes established between objects".¹² Essentially, differentiation is the process of perceiving change. Specification identifies a change as a *certain* change. In differentiation, the image-object can be identified as doing something; specification is identifying what that something is.

Henri Bergson via Deleuze explains "[I]f movement is taken from the moving body, there is no longer any distinction between image and object, because the distinction is valid only through immobilization of the object."¹³ The image-object is never immobilized; it is allowed to move, to *be a moving image*. Deleuze (as a protegee of Bergson) recognizes that the information—the comprehensible part of cinema—comes from the static and definitional parts of the medium, of which the image is not part. The image-object, however, indicates these parts. Changes in spatial or temporal position within the frame situate the cinematic image toward an external (and unframed) world. Additionally, such changes (no matter how fluid) connote a causality.¹⁴ Rather than immobilizing the image, the interval through which the image passes is immobilized. The comprehensible portions of cinema—what we call the narrative or the meaning—are the intervals and not the images. Differentiation delineates the image from the whole (so some motion can be understood and perceived; i.e. the passage through a coordinate system). Specification more narrowly links images to one another, where one image contributes to another. By

¹² Deleuze, *Cinema 2: The Time-Image*, 28.

¹³ Deleuze, *Cinema 2: The Time-Image*, 27.

¹⁴ The movement-image as spatially and externally causal; the time-image as temporally and internally causal.

immobilizing to dissect the intervals, the image in analysis does not lose that which makes it unique—movement.¹⁵

Image-objects

The most salient feature of the imagistic world is that all things are images. For the most part, this seems obvious—the cinematic screen shows the audience a world as images, so all perception is done *through* images. However, as much as images visualize, images also codify. Deleuze extends imagehood to all things, whether visible and not. That is to say, the between space—the relation of image-objects—generates cinematic causality as well as audience perception of that causality. Differentiation and specification state, each image as an object fulfills a purpose; this purpose is both an internal causality (what happens in the cinematic world) and an external comprehensibility (how we understand what happens in the cinematic world). The acts of perception and cognition fuse with the images that need to be perceived and cognized. The image-object functions causally and meta-causally.¹⁶

Deleuze describes two essential image-objects that populate the image-universe: the movement-image and the time-image. These two objects exist, in their pure form, as diametric opposites. The movement-image acts upon and describes a spatial causality

¹⁵ Again, this is where semiotics fails. The image, as much as it is known as moving, allows for things to move. The image becomes a stage; the interior objects move and the image does not. The result is that the image as a static form seizes the objects from motion. When the interior motion is discussed as the image whole, the motion has to assume the same state of the image, that is, static.

¹⁶ This is the primary split between Deleuze and semiotics. Where semiotics explain with images as seeable and legible, Deleuze extends the image to also be actionable. This is what Deleuze means to communicate about images are relational. It is not the being in the image that acts upon the world, but the images that co-relate to structure our perception of the being as sentient.

(sensory-motor schema); the time-image, a temporal one (sensory-reflexive or sensory-introspection schema). The movement-image privileges space by manipulating time; the time-image privileges time by manipulating space.¹⁷ In both cases, the image-object generates an internal consistency and an external comprehensibility of how space or time is constructed.

Movement-image

The movement-image grows out of the dedication of classic cinema to narrative. Similar to mainstream views of narrative as "the construction of causal chains",¹⁸ the movement-image smoothes contiguous space (discrete perspectives) into a continuous illusion. The camera's perspective, in turn, situates the camera within the corporeal cinematic world by bearing witness to the actions. This results in a disruption of time (Deleuze's indirect representation of the time-image) and so a solidarity of durations.¹⁹

While image-objects can be generally qualified as being relational, the movement-image is outwardly relational.

"Classical narrative cinema constructs itself from the interaction between space and protagonist [...] [and] is to be seen as a kind of analogy to the movement of the (biological) organism, where the latter is a kind of perceptual filter, or nodal point, or *screen*: in this way, an unproblematized link is created between sensation and movement."²⁰

¹⁷ Deleuze, *Cinema 2: The Time-Image*, 34-43.

¹⁸ Angelo Restivo. "Into the Breach: Between the Movement-Image and the Time-Image." In *The Brain Is the Screen: Deleuze and the Philosophy of Cinema*, edited by Gregory Flaxman, 171-93. (Minneapolis: University of Minnesota Press, 2000.), 174.

¹⁹ The Bergsonian term duration (*durée*) denotes the heterogenous experience of/through time.

²⁰ Restivo, 174.; original emphasis

The movement-image gives visual form to visible causality by binding the cognitive processes and embodied actions of the spectator.

For example, the final montage of D.W. Griffith's *The Birth of a Nation* cuts between a cabin of women under siege and the racing horses-bound rescuers. As the women hold back the door (pushing right to left) against the invaders (pushing left to right), the rescuers gallop across the landscape (moving left to right). Switching between these scenes forces the audience to draw the spatial connection between the viewed world and the unviewed (total) world. The images claim that relative positions are absolute (or, at least, not deceptive). Time, on the other hand, is relative; this allows the audience to experience two simultaneous durations in a single cinematic duration. Cutting between the two scenes does not communicate confluence, but concurrence: the paired actions are happening *at the same time* although the audience can only experience the durations one at a time. The events are parallel temporal tracks played out along an absolute spatial one. Moreover, the audience understands that they do not *miss* any moments through the cutting, and instead re-experience the same time, albeit somewhere else. The sequence directly presents space by distorting time; the audience comprehends the physical relationship between the visible scenes through the visual codes.



Figure 1: D.W. Griffith, *The Birth of a Nation*, (1915)²¹

The movement-image is divided (*specified*) it into parts. While there exist many subdivisions, the basic elements of the movement-image are the *perception-image*, *affection-image*, and *action-image*.²² The subdivisions correspond to the stages (*intervals*) of spatial causality (*relatedness*). The image-object, as informational, proceeds from a

²¹ "The *The Birth of a Nation*." http://www.archive.org/details/dw_griffith_birth_of_a_nation. (accessed 1 Apr 2010)

²² Deleuze establishes a fourth component—the relation-image—that is not unique to the spatial or temporal capacities of cinema. I have decided to explain the relation-image as a tertiary feature of the relatedness of cinematic images rather than as part of the movement-image, as Deleuze does, in order to avoid confusion when it is used with the time-image.

"signalectic material",²³ comparable to a oscillating wave. A wave in an oscilloscope, for instance, changes, but remains identifiable as having a frequency, period, global and relative extrema, and various other characteristics. The image-object, similarly, has defining features and stages. The perception-image forms the start and the action-image forms the end of the interval; the affection-image identifies points within the interval to give form to the modulation.

In the example from *The Birth of a Nation*, the scene begins with the rallying of forces to whisk off to the cabin; this constitutes an affection-image, where perceptions form decisions and emotions are perceived as effectuating. The affection-image bridges "a perception which is troubling in certain respects and a hesitation of action."²⁴ Deleuze invokes semiotic firstness. By this, he means the image act as an involution; that is, it stands alone as tautological and understandable. The affection-image forms the signal to suture the effectuated response with the visual constructs. The action-image is found in the sprint to the cabin. The action-image denotes an object understood only through relative components or in reaction to some event (in semiotics, this is called secondness). The viewer knows that the speed is that of urgency due to the circumstance. The montage, on the whole, visualizes thirdness (Deleuze's relation-image) situating the scene within the social construct of Reconstruction and mores of racial relations. The difficult and crucial image-object becomes the perception-image.

²³ Deleuze, *Cinema 2: The Time-Image*, 29.

²⁴ Schwab, 119.

The perception-image corresponds to the initial reception or potential formulation of a sensory-motor chain and the marking in of the movement-image's interval. Where the affection-, action-, and relation-image correspond to firstness, secondness, and thirdness, the perception-image corresponds to a "zeroness."²⁵ This means the perception-image precedes both any meaning or understanding structures. "The apple is red" exemplifies firstness—understanding without relation. Then, secondness can be found in "This apple is redder than that apple," understood through relating objects. Lastly, thirdness—"This apple is redder than normal"—positions signs in a holistic context (often said to be societal). To precede these, zeroness (and so the perception-image) is purely the reception of information. The perception-image links purely optical sight with purely receptive cognition, where understanding has not yet happened. In our example, the apple is not yet seen as an apple, but *is seen* and *is received*. For Vivian Sobchack, zeroness resides in the expression of the cinematic world in the projector or projection. For Deleuze, however, zeroness resides in the image itself, not in its material underpinnings. In our example from *The Birth of a Nation*, the perception-image—the image of sight-without-meaning—is the subjectivity of the camera; that is, the perception-image is the recognition of the camera as, to borrow from Sobchack, a viewing subject to be viewed.²⁶ The zeroness of the image-object draws the viewer into the perceptive apparatus. Likewise, the Calvary perceive information about the cabin. Where the viewer is open to perception, so are the protagonists (of course, this is different for abstract film).

Time-image

²⁵ Deleuze, *Cinema 2: The Time-Image*, 31.

²⁶ Sobchack, 41.

The time-image stems from the break of cinema from the classic Hollywood model. Where the movement-image seeks to preserve the continuity of spatial relationships, the time-image serves to construct "the cinematic sequence [...] [as to preserve] the temporal duration of the event the camera [registers]."²⁷ This is done by inverting the causal structure, "for the [movement-image] is dependent precisely on a sequencing process in which the 'meaning-effect' emerges out of the construction of a [causal] chain. Insofar as the time-image is 'liberated' from the kind of enchainment, the hypothesis emerges that the time-image can be seen as a symptom of"²⁸ signifiers "unquilted from from [their] symbolic [spatial] order."²⁹ That is to say, the time-image generates new meaning amongst co-temporal or sequential elements. Deleuze describes this shift as the privilege of a divergent series of elements over a convergent series.³⁰ In other words, the movement-image is prosaic and literal, converging on the execution of a singular event; the time-image is poetic and abstract, diverging toward multiplicities of thought and contemplation. Visuality is singularly determined in the movement-image, and not in the time-image.

Similar to the movement-image, the time-image is comprised of three parts. Unlike the neat causality of the movement-image, the compositional motifs of the time-image reside within and overlap each other; their relation is elaboration. The time-image, in this way,

²⁷ Restivo, 175.

²⁸ Restivo, 180.

²⁹ Restivo, 180.

³⁰ Deleuze, *Negotiations, 1972-1990*, 53.

points inward, viz. toward to the nesting and nested image-objects.³¹ The time-image realizes the potential of cinema to directly manifest duration. In the time-image, "the camera has liberated itself from dependence on the representation of the image [...] and so it creates what [Deleuze] calls a 'pure optical situation.'"³² Time—that is, Bergsonian duration—is allowed to flow without recourse. The time-image encapsulates visual-cognitive association, emulating visually the mental processes of memory and experience.

The nested structure of the time-image follows a basic logic. A perception-image³³ immediately leads to a Bergsonian recollection-image, called a virtual-image by Deleuze. Where the movement-image binds cognition with the external world, the time-image binds cognition with the internal world. The virtual-image, like a mirror reflection, exists contemporaneously with the actual-image. The actual-image and virtual-image mutually arise through internal reflection. Deleuze invokes Bergson to explain:

"The present is the actual image and its contemporaneous past is the virtual image, the image in a mirror. According to Bergson, 'paramnesia' (the illusion of *déjà-vu* or already having been there) simply makes this obvious point perceptible: there is a recollection of the present, contemporaneous with present itself ... 'Our actual existence, then, whilst it is unrolled in time, duplicates itself along with a virtual existence, a mirror image. Every moment of our life presents the two aspects [...] perception on one side and recollection on the other.'"³⁴

³¹ This, however, is not inward-looking. The semiotic mode of sight dissects the image-as-is; the time-image creates a vector toward an internal connection.

³² Restivo, 175.

³³ For the time-image, the perception-image is alternately called the actual-image. To avoid confusion, the term actual-image will mean "the first perception-image of the time-image."

³⁴ Deleuze, *Cinema 2: The Time-Image*, 79.; original emphasis

Where the parts of the movement-image fluidly partition an oscillating signal, the parts of the time-image partition one another. Perception in the former explodes, pushing outward while diluting nuance; in the latter, perception implodes, condensing and concentrating its form. The time-image explores the actual-image by comparing it to a past perception-image (the virtual-image). The actual-image and the virtual-image are bound together and split "each moment as present and past."³⁵ This linkage of actual- and virtual-image is known as a crystal-image. The crystal-image refracts time, pointing the bound image-objects toward the past and the future (the present is manifest *in* the crystal-image). As the actual-image generates a virtual-image, the virtual-image reveals a once-actual, now-perceptual image-object. This second perception-image is where actualization occurs; that is, actualization in the past through contemplative assessment.

The time-image seems to reword a psychological reading of cinema; Deleuze disagrees. Psychoanalysis looks to images as manifestations of subconscious beliefs and "this spiritual dimension becomes the object of cinema."³⁶ But, "[i]t is questionable whether the notion of 'the imaginary,' even, has any bearing on cinema; cinema produces reality."³⁷ The time-image exposes the real psyche cinema; psychoanalysis imprints a ideal psyche of the spectator on the cinematic image. The time-image leaves a very real residue upon subsequent image-objects.

³⁵ Deleuze, *Cinema 2: The Time-Image*, 81.

³⁶ Deleuze, *Negotiations, 1972-1990*, 59.

³⁷ Deleuze, *Negotiations, 1972-1990*, 58.

A prime example of the time-image at work comes from Alfred Hitchcock's *Vertigo*. Experiencing a torrid dream, Scottie is thrust into a sequence of images that draw connections in his investigation. The actual-image is formed by the camera moving toward Scottie, who is tossing in his bed. The viewer is cued to a "perception of perception,"³⁸ aware of internal reflection. The virtual-image comes from the dream montage. The camera moves toward the necklace Scottie recalls being worn by Judy/Madeleine and found in a portrait of Carlotta Valdes. Here, the virtual-image plays out the defragmentation of realization. The liberated camera breaks the coherence of spatial continuity by exchanging its position with Scottie's and the necklace's position with an open grave site. The shots break spatial or environmental logic; the camera moves through memory. The shots freely associate (*diverge*), hovering and refining a single perception. The final perception-image of Scottie awakening immediately opens into an affection-image of his distraught face.



The complexity of Deleuze's image-ontology results in a few upshots. First, the cinematic image can be spoken of as both a visual and a cognitive event. Since the image-object unites what is seen and what is cogent, the viewer is implied in the existence of image-object. Hence, the cinematic experience is an optical as well as a mental task. This means that being situated within the field of sight leads one to being situated in the field of cognition, which has particular implications when the viewer is the viewed object.

³⁸ Schwab, 120.

Secondly, the dichotomy of the movement- and time-image visually correlates the distinctions of time. The movement-image is grounded in sterile time; that is, time without the presence of durations other than one's own. While personal duration is heterogeneous *de facto* (via Bergson), sterile time is measurable. The indirect time-image unitizes time; the difference between moments is only length. On the other hand, the time-image unleashes pure duration. In the time-image, measurable time and experienced time produce an admixture. Time is heterogeneous; one instant cannot be equated to another because of length. The existence of the two concepts means that a visual form can manifest the particulars of time and duration without necessitating a sutured viewer. Moreover, the viewer can be seen as both involved and not in the process of cinematic expression, which holds potential for feedback.

Lastly, cinematic images as relational grounds visual codes in a higher complex. This means that what is seen is a part of a larger data structure that can be perceived indirectly. The screen displays entries and the viewer interpolates the relations. The benefit of placing cinema in the realm of data structures is that now it can be analyzed through computational and algebraic methods. The rigor these imbue foreground potential avenues only currently accessible through mathematical avenues.

2.3: Image formalism

Deleuzian imagehood is not without its caveats. For instance, Deleuze presents the time-image as if it organically arises within modern cinema. Even when Deleuze highlights directorial practices, the time-image results from the social subconscious. In a specific example, Deleuze credits Jean-Luc Godard with developing his own cinematic criteria and then invokes Mikhail Bakhtin "to identify [Godard] with modern cinema."¹ The time-image arises in Godard's films—the symptom of modern cinema—insofar as Godard's films borrow visual language as the novel borrows written language through "its 'plurilingualism'".²

The main issue is that Deleuze disregards formal considerations for phenomenological ones; this chapter aims to reconcile this. The overall goal is to reconnect the visual feedback loop with media theory. Deleuze provides a structure for discussing how information is generated rather than transmitted in the expression of a medium. Similar to the relatedness of images, the components of visual feedback related and so engender certain phenomena. Relying completely on Deleuze leaves a gap between the immaterial relationships and the formal relationships (the apparatus). Sean Cubitt's theory of the cinema effect focuses on the formal aspects of cinema, and how they construct relational complexes. Similar to Deleuze, Cubitt claims the formal relations of cinema result in comprehension—formal relations generate information as do phenomenological ones. Cubitt bridges the gap by identifying what the formal components contribute, and how that contribution colors the internal relationships.

¹ Deleuze, *Cinema 2: The Time-Image*, 184.

² Deleuze, *Cinema 2: The Time-Image*, 187.

I/eye: Establishing inside and outside

The cinema effect begins at a moment of firstness. The primacy of formal signification (and the topic of the next section) is called the pixel. While the pixel is the first component (i.e. cinematic image as moving) for Cubitt, it depends on the spectator accepting the "dynamic screen."³ Cognition of motion requires, as Deleuze points out with the perception-image, precognition. Hence, a precognitive moment—a zeroness of signification—exists to position the spectator within the cinematic apparatus and set motion in motion. Borrowing from Vivian Sobchack, this zeroness will be called the I/eye.⁴

First, we need to revisit the perception-image. The perception-image, unlike the other subdivisions of the movement-image and time-image,⁵ does not describe a cognitive process. Instead, the perception-image is precognitive—it unites optical sight and pure sensation.⁶ Deleuze explains that the perception-image originates disruption to the signaleptic material of cinema. In a way, it amasses potential energy; the affection-image releases that energy in a kinetic oscillation of the signal by relating various image-objects. The perception-image is both non-directional and omni-directional. In other words, the perception-image foregrounds causality by establishing an initial point from which a multitude of possible effectuation intervals could proceed. As the affection-

³ Manovich, *The Language of New Media*, 96.

⁴ Sobchack, 40-45.

⁵ Recall that in the time-image, the perception-image is called the actual-image to delineate amongst the external perception and the internal recollection.

⁶ A sensation that, in the time-image, overwhelms and leads to the recalled virtual-image.

image establishes relations amongst image-objects, the possibilities narrow in on a single interval. The perception-image, therefore, is an origin—a moment to and in which we see the foundations of a causality (similar to a stone cast into water). Deleuze attributes the ambiguity of the origin to precognition and pure optics. Therefore, the perception-image foregrounds cognition and optics as it simply gathers the material for cognition and optics. Deleuze explains:

"We saw [...] that firstness, secondness and thirdness correspond to the affection-image, the action-image, and the relation-image. But all three are deduced from the movement-image as material, as soon as it is related to the interval of movement. Now this deduction is possible only if we first have a perception image. [...] The perception-image will therefore be like a degree zero in the deduction which is carried out as a function of the movement-image: there will be a 'zeroness' before Peirce's firstness. [...] [T]he perception-image received movement on one side, but the affection-image is what occupies the interval (firstness), the action-image what executes the movement on the other side (secondness), and the relation-image what reconstitutes the whole of the movement with all aspects of the interval (thirdness functioning as closure of the deduction)."⁷

The affection-, action-, and relation-image manipulate the perception-image; they give emotion, meaning, and context to what is initially perceived. Specifically, the affection-image concretizes perception by transforming the sensed into sensation. The effectuation interval takes in raw information and outputs a response. In *Soylent Green*, as Robert Thorn (Charlton Heston) listens to Sol Roth (Edward G. Robinson) reveal the secret of the Soylent Corporation on his deathbed, his expression is blank expression at first. Thorn is unable to process what he has been told (perception-image 2) as much as Sol's circumstance (perception-image 1); the information remains raw and undetermined.

Then, Thorn begins to follow Sol's body as it is transported away. Initially he acts out of

⁷ Deleuze, *Cinema 2: The Time-Image*, 31-32.

grief (affection-image 1 → action-image), only to realize Sol's sacrifice for Thorn's cause (affection-image 2 → action-image). In this latter realization—Sol death as an impetus for Thorn's discovery—combines simultaneous emotion, and dually determine Thorn's action. The raw information is recombined multiple times, defining and redefining the scene. The image-objects generate different relationships: *is Thorn simply upset with Sol's death and is trying to recover his body?*; or, *is Thorn just using Sol's death as an excuse to enter the bowels of the Soy lent factory?* Important to take away is that the conflicting and complementary relationships amongst image-objects are fluid yet determinate. No single image-object determines the outcome; the resultant action is a combination of causalities as much as an erasure of potential outcomes. In the perception-image, however, all outcomes are potential as the precognition expresses a complete lack of determination. The interval of effectuation begins determining causality by separating useful from useless information.

Now, the pixel parallels Deleuze's notion of effectuation. "Every object, every thing, must see its own identity swallowed up in difference, each being no more than a difference between differences. Differences must be seen *differing*."⁸ As much as the affection-image, "the cinematic present"⁹ requires a predecessor for one main reason: intervals of change require a reference point. In other words, the pixel determines motion by determining what is in motion as well as what is not. To enter the interval of effectuation, the beginning of the interval (the perception-image) must be established; otherwise, image-objects lack causal relationships and the spectator is unable to link the act of

⁸ Sean Cubitt. *The Cinema Effect*. (Cambridge: The MIT Press, 2004.), 31.; original emphasis.

⁹ Cubitt, 33.

differing to the *signalectic oscillation*. In the example from *Soylent Green*, reading Thorn's actions as unrelated to Sol's death a difference divorced from differing. Likewise, to experience in the cinematic present, an unmoving "origin"¹⁰ must be established; otherwise, motion becomes indistinguishable from stasis.

Cubitt explains that "[i]n cinema, the dark transport of the filmstrip undermines the subject as timeless being, specifying in its place a constant process of coming into being. Cinematic zero inscribes the dynamic equilibrium of spectatorship as unfinished process."¹¹ Where the photograph allows for timeless revelry and contemplation, cinema never reveals its full material form. Instead, the spectator constantly spectates anew in the presence of the moving image. Each frame is distinct; the similarities amongst frames (e.g. an unmoving tree) orients the audience to the differences amongst frames (e.g. birds scattering as a man approaches the tree). In truth, the tree is no more static than the birds (it is re-captured by the film in each frame), but the audience necessitates stasis to understand dynamism. The pixel, as a membrane between what the image was and what it will be, assumes the spectator is subconsciously aware of the static and the dynamic elements. In this, the cinematic spectator assumes the cinematic image acts like direct perception. Motion is the product of the image as a lived-body being-in-the/a-world¹² and spectator's ability to vicariously relate to that body's perception. Vivian Sobchack explains further:

"Perception [...] is more than a mere mosaic of sensations on the body-object, more than a mere psychological phenomenon. [...] Perception is the bodily access or agency for

¹⁰ Cubitt, 33.

¹¹ Cubitt, 40.

¹² Sobchack, 40.

being-in-the-world, for having both a world and being. Perception is the bodily perspective or situation from which the world is present to us and constituted in an always particular and biased meaning. [...] [T]he lived-body constitutes an *intrasubjective* and *intersubjective* system in which being is both understood and signified as significant—that is, as intentional. [...] And because intentionality ... is articulated in existence through agency and activity of the lived-body being-in-the-world, every conscious lived-body is semiotically and hermeneutically competent in its ability to commute perception to expression and back again. Thus, the primacy of perception as the primacy of expression [...] is synopsisized in lived-body experience as the *primacy of communication*."¹³

Sobchack highlights two main points: (1) perception signifies a perceptive agent and (2) perception implies a perceivable world. The pixel is contingent on the spectator being aware of both of these. The moving image functions hermeneutically for the audience and an artifact of embodiment for the camera. The former is that the image is a mediation of some perception; the latter is a direct perception. The coalesced hermeneutic lived-body—seeing through the eyes of the camera—is precisely the I/eye; the cinematic "eye" meets the personal "I".

Sobchack invokes this correlation of eye and I to discuss for embodiment in the cinematic experience. Sobchack explains that spectatorship is the negotiation of seeing, the "viewing-view/viewed-view".¹⁴ The *viewing-view* corresponds to the spectator positioned before the screen; the *viewed-view* corresponds to the perception of the camera. Moreover, the hermeneutic/embodied relationship of the filmmaker, camera, and world formulates the cinematic eye—a viewer who has been viewed. The

¹³ Sobchack, 40-41.; original emphasis

¹⁴ Sobchack, 200-201.

embodied/hermeneutic relationship of the viewer, screen, and display method formulates the personal I—a viewer who is viewing. When viewing a moving image, the personal I (a forward vector of perception) is augmented by the camera's register (i.e. perception, also a forward vector) of the cinematic world. In the moment of motion—the pixel—these two vectors form a resultant vector that allows us to perceive the cinematic world through a translucent frame.

Hence, the zeroness of the cinema effect is this meeting. The viewer's vector to the screen ("I am watching.") and the camera's vector to the world ("The eye is seeing.") meet at the image itself. Sobchack states this meeting of views enacts possession on the part of the spectator:

"[T]he camera that mediates and realizes the filmmaker's original perception is only indirectly present [as is the filmmaker] in the spectator's perception of the world as it visibly appears to his or her vision. Thus, the spectator perceives the world in a complex 'invisible' and introceptive mode, that is, within is or her own perception lived bodily as 'mine,' and with the camera's and filmmaker's perceptions, both also lived bodily as 'mine.'"¹⁵

The personal I becomes indistinguishable from the cinematic eye, creating the I/eye. The act of perceiving the moving image is established through the viewer's acceptance of perpetual and transparent augmentation. The viewer knows the camera is an other, but, for the sake of seeing what it sees in its position in and toward a world, it is assimilated as the Self. The zeroness of cinematic cognition is then an act of extension—an extension of the senses, and of the spectator's lived-body. First, the spectator comprehends the visual

¹⁵ Sobchack, 197.

surrogate and then extends natural perception with this prosthesis. The paired views now functions a cohesive unit to allow cinema its effect.

Sobchack rebuts the argument that these two viewing subjects ever merge to make the film into a "viewed object."¹⁶ Her claim is that the act of viewing a film is a continual negotiation of the spectator and camera/filmmaker/screen. To an extent, Sobchack is right—when watching a film, the viewer never replaces the camera's perspective to perceive the world directly. And, for Sobchack' purposes of explaining the phenomenology of the film experience *through the structure of the material apparatus*, this holds. The spectator, however, is rarely aware of the material apparatus, let alone the structure to distinguish perceived singularity from actual singularity of perspective. Sobchack even recognizes that when watching a film, it appears "*directly* felt [and] *sensuously* available to the viewer."¹⁷ Since this argumentation deals with the perceived viewing experience (the cinema effect), it makes sense to allow this unit to exist as an indivisible unit.

The I/eye has one main implication for Cubitt's theory (as well as for the visual feedback loop). Despite perception feeling direct, spectator is always removed. That is to say, within the cinematic apparatus, the spectator fulfills a different role than outside of the cinematic apparatus. Hence, the I/eye implies that the cinematic apparatus has an exterior and interior. On the exterior, the spectator does not relate to the hermeneutic lived-body; on the interior, the spectator does. Once within the interior space of the apparatus (e.g. in the theater), the subsequent moments of firstness, secondness, and thirdness proceed.

¹⁶ Sobchack, 20.

¹⁷ Sobchack, 8.; original emphasis

Even more, to view moving images automatically places one within the apparatus. While this seems trivial with moving images, it is less so with visual feedback loops.

The Pixel: A body in the present

At its most basic level, the cinematic image expresses "a process of perpetual change".¹⁸ This undisturbed change—i.e. the moving image without further qualification or manipulation—is the pixel. The pixel produces, what can be called, the presentness of cinema—the sensation of spectating here and now. Like firstness, presentness subsists unitarily.¹⁹ While the condition of I/eye certainly and directly enables the pixel, the pixel relates internally; the pixel combines being *in situ* with being aware.

The living-body of the viewer, as augmented by the lived-body of the camera/filmmaker, becomes unhinged in time and space within the cinematic apparatus. The condition of I/eye makes the spectator and the camera co-dependent. In turn, the spectator experiences a spatio-temporal past as a spatio-temporal present; the moving images unfold in (a) real-time to the spectator. Hence, the moving images gain a living-body—that of the spectator—to use as a substrate. As a living-body in-the-cinematic-world, the spectator perceives (motion) as one does as a living-body in-the-world; that is, the spectator is always experiencing and is unable to avoid change. Cubitt explains "[t]hat the cinematic present [...] can be given a number: zero":

¹⁸ Cubitt, 39.

¹⁹ "[T]he cinematic event [...] does not depend on a prior external world [...] The filmstrip neither has nor lacks a transcendent origin, whether external reality or narration, that lies anterior to it. Film and world are of the same matter. Demanding that the one represent the other not only creates the distinction between the two; the thesis of cinematic realism ensures that either the world or the cinema is condemned to unreality."; Cubitt, 39.

"Zero is not a quantity so much as a relation. [...] [A]s a noun, zero itself 'fails to be exemplified': 'Since nothing falls under the concept "not identical with itself", I [Cubitt quoting Frege] define nought as follows: 0 is the number which belongs to the concept "not identical with itself". The concept of nonidentity reveals zero's quality of internal difference. Zero is a relation rather than a (no)thing because it is always already a relation of nonidentity with itself. Zero acts, rather than is".²⁰

Like Deleuzian image-objects, the cinematic present fundamentally relates. For the pixel, the relation is always visible, internal, and present. The pixel is less a demonstration of change than a change itself—the pixel is visible flux. Deleuze relegates this "instability [that] is the perpetual source of movement"²¹ behind the screen; the relationships amongst image-objects create the profilmic. The pixel, on the other hand, "is symbolized by its distance *from zero*",²² and is characterized by its reflexive dissimilarity. This dissimilarity is absolute; the pixel always relates by being further from its static origin.

First and foremost, the spectator, who is situated within the cinematic apparatus, becomes aware that the moving image modulates (as Deleuze would say); it is at once the same and different. For example, the spectator of Thomas Edison's *Serpentine Dance* watches a woman twirl and spin before the camera. Her motion testifies to cinematic "spectatorship as unfinished process."²³ Unlike a looking at a photograph, watching a film is a temporal act. The dancer requires the spectator's full and continual attention insofar as the spectator's recognizes cinematic expression comes from the fundamental motion of the

²⁰ Cubitt, 33.

²¹ Cubitt, 33.

²² Cubitt, 33.; emphasis added

²³ Cubitt, 33.

image. Inversely, to cease spectating separates motion from the image, in turn negating expression and dividing the prosthetic lived-body from the living-body. In the case where spectatorship lacks the motion, cinema becomes symbolic and conceptual (recall inward-looking). Playfully, Andy Warhol's *Empire* seemingly completes the process of spectating by filming the Empire State building from a fixed position for eight hours. The cinematic present is not accelerated as one would expect; instead, *Empire* constructs a one-to-one presentness by reconstructing (and privileging) the camera's duration.

As a feature of cinema, the pixel is a fully organic. Cubitt explains:

"The non-identity of the pixel, the formless, initiating instant of sensation, in the moment of firstness [...] For cinema, [firstness] is the interpenetration of the physics of light and the physiology of seeing, the world worlding freely over the senses. Duration without beginning, end, or direction, firstness is the simplest possible awareness of sensation, and it antedates, logically, chronologically, and phenomenologically, all consciousness of unified objects."²⁴

This final point—the pixel precedes unified objects—refers to the full construction of cinematic duration as *contiguous continuities*. In the cinematic present, the spectator is concerned solely with seeing; the current element is all that is.

The Cut: The echo of the past

The cut ruptures the cinematic present by relativizing the pixel. As the camera assumes a new perspective instantaneously, the spectator is presented with a juxtaposition of pixels. In this sequencing, the current pixel relates outwardly as distinct from the previous pixel. In other words, the ordering of pixels generates a relation of secondness. Cubitt explains:

²⁴ Cubitt, 48-49.

"[T]he ideology of attentiveness and the pointlessness of reverie [of the pixel] demanded a more substantial organization of film's temporal flux. Framing and compositing distinguish in time as they determine in space. Composing the image in layers not only distinguishes movement into objects: it demands a temporal relation between layers, here in the construction of causality (the boy steps on the hose; the water stops flowing). ... The cut that establishes foreground and background, onscreen and offscreen space allies with the construction of a temporal horizon to convert the random jostling of pixels into unified and discrete cinematic objects."²⁵

The solitary pixel produces a first-degree relation; the internal and absolute change implies only one object, that is, itself. The cut produces second-degree relation; the current pixel is externally different from its predecessor. The shift of perspectives connects the visible pixel to the absent pixel. By itself, the pixel appears to be all that constitutes cinema. The cut objectifies the pixel; it can be acted upon, manipulated, and reformed. The cut interrupts the present.

"In cinema, we are aware first of movement and only secondarily of what moves and that its movement constitutes a coherent action. [...] The cut turns sensation into perception in a retrospective ordering of raw, undifferentiated (and mechanical) flux into identified objects. [...] [T]he elementary practices of the cut convert the play of pixels into objects, worlds, identities."²⁶

In this, the cut produces a reverse trajectory—a pastness—within cinema.

The cut establishes a moment of secondness—that is, an understanding of meaning through relative components. In *Die Hard* (1988), when John McClane (Bruce Willis) pulls the trigger and camera cuts to Hans Grubber (Alan Rickman) being shot, the

²⁵ Cubitt, 45.

²⁶ Cubitt, 49.

spectator understands the relationship between the two moments by understanding their continuity in space-time. The cut disrupts the one pixel to beget another.²⁷ The comprehension of McClane successfully shooting Grubber comes in the second moment. Thus, the cut preserves a causal path by relating the current moment to the preceding one. Unlike Deleuze's profilmic action-image (the second-order relation for the movement-image), the cut is simply a filmic relation.²⁸

The cut also forces a reconstitution of all preceding moments of signification. "The presubjective subject of the pixel is one with the apparatus",²⁹ allowing for a direct sensation of the world through a unified I/eye. "The cut splits apart the elements of the apparatus" as to vivisection the self and its appendage, only to reunite them as an "object."³⁰ The need for "[o]rientation takes the place of immersion".³¹ The cut breaks and reconfigures the I/eye. Afterwards, the spectator must form a new augmented body.

The Vector: The continual disruption of elsewhere/elsewhen

Following the sequence, a third-order relation arises by relating cuts to one another. Cubitt refers to the moment of thirdness as the vector. The cut has defined an awareness of past, allowing freedom of motion from the present backwards. The spectator can now

²⁷ Cubitt calls this "reframing"; Cubitt, 45.

²⁸ In *Die Hard*, the action-image also represented by John McClane shooting Hans Gruber. The relation, however, is not the causality of direct space-time. Instead, it is the relation of perception-image; McClane perceiving the necessity to shoot Gruber; and the affection-image; McClane weighting the danger of shooting Gruber as he holds McClane's wife.

²⁹ Cubitt, 67.

³⁰ Cubitt, 67.

³¹ Cubitt, 67.

connect the sensations of presentness to previous sensations of presentness. The vector extends the freedom of motion forward by giving the spectator a sense of the future, i.e. futureness. "The vector," as Cubitt explains it, "takes us one step further: from being to becoming, from the inertial division of subject, object, and world to the mobile relationship between them."³² Furthermore, "[w]here the cut instigates endings, the vector enacts beginnings [...] [by giving] the moving image a future, the possibility of becoming otherwise than it is [or has been]."³³

The vector relies on inductive reasoning. After the pixel has been disrupted enough by the cut, the spectator becomes aware that the disruptions are systemic. Cinema, on the whole, is a sequence pixels; each present moment gives way to the next. Hence, the cuts align spatial causalities and generate temporal orders; they exemplify how things become. It is only natural that the viewer begins seeing the structure as a whole. "The pixel grounds us in the film as a present experience, the cut in the preexistence of the filmstrip to consciousness of it, the vector in the film as the becoming of something as yet unseen."³⁴

Where the pixel and the cut deal exclusively with the visible (or once visible), the vector communicates the invisible—how something might become and how space might be navigated. The spectator must willingly split from the camera's eye to imbue personal intentionality upon the visible world. The vector, then, connotes an asymptote. The

³² Cubitt, 71.

³³ Cubitt, 71.

³⁴ Cubitt, 71-72.

predicted future can only be approached, yet can never be reached.³⁵ Sobchack refers to this asymptotic behavior as a negotiation of viewing subjects.³⁶ However, the negotiation is always one-sided. The spectator, while continually projecting outcomes, continually reunites with the camera. The potential space-time folds upon itself and evaporates as the spectator passes into future actualities while forgetting projections.

⇒



Figure 2: Camille Utterback and Romy Achituv, *Text Rain*.(1999)³⁷

Although the cinema effect and image-ontology formulate similar arguments—cinema is a medium of relations—the two theories rely on vastly different modes of relation.

Deleuze posits that the relations of cinema result from perceiving causality. As spectators,

³⁵ Cubitt, 73.

³⁶ Sobchack, 8.

³⁷ Camille Utterback. "Text Rain." <http://www.camilleutterback.com/textrain.html>. (accessed 5 Apr 2010)

we comprehend moving images through the construction of a network amongst visible and non-visible points. Narrative, for instance, comes from the relations themselves. Cubitt posits that the relations of cinema result from seeing the formal play of motion and disruption. The continual disruption of motion is all we perceive in cinema; the higher-order notions of narrative and metaphor come from how the spectator imbues the relations with meaning. That is to say, Deleuze constructs a theory that *denotes* interpretation and Cubitt constructs a theory that *implies* interpretation.

For the visual feedback, Deleuze and Cubitt offer valuable meta-commentary on a core issue with defining the form. In one sense, the visual feedback loop is sensed; the spectator-user perceives how actions relate on an interpretive level. Alternately, the visual feedback loop is formal; the spectator-user perceives how actions relate on a logistical level. In Camille Utterback and Romy Achituv's *Text Rain*, people understand their gestures as being in service of falling text poetically and physically. The spectator-user does not simply rely on the image of the body, but also the body of the image. Hence, the definition of visual feedback requires a variety of parts to account for this simultaneity.

Before entering into new theory, a summary of the main points from Deleuze and Cubitt is in order.

Table 1: Relational concepts compared

	zeroness + precognitive + pure reception (e.g. <i>sight-unto-itself</i>)	firstness + cognitive + singular comprehension (e.g. <i>quality of this thing</i>)	secondness + cognitive + relative comprehension (e.g. <i>this vs. that</i>)	thirdness + post-cognitive + contextual comprehension (e.g. <i>this is an instance</i>)
Gilles Deleuze: image-objects	perception-image actual-image + sight of visible things	affection-image virtual-image + seeing as visual act	action-image perception'-image + gaze as selective act	relation-image + object as instantiated thing
Sean Cubitt: cinema effect	I/eye (via Sobchack) + reception of physical/visible situation	pixel + movement as non-similarity	cut + disruption creates non-similarity	vector + movement and disruption construct a whole
Applicable concepts	Relatedness is different externally and internally. Perceiving perception (Deleuze) does not equal perception (Cubitt)	Images visualize embodied experiences through codification.	Disruptions to visualized experience re-embodies the spectator as experiencing. The direct image of space or time requires the disruption to time or space.	Virtuality requires both experience and meta-experience.

2.4: Visual feedback & the desired form

For the visual feedback loop, our theoretical discussion of cinema serves a few ends. Most simply, the discussion provides applicable concepts of how visual media form relational complexes. The theories posit that the spectator sees images, yet comprehends relations. The individual moving image, in this way, influences and is influenced by like-objects, namely moving images. Though conceptually interesting unto itself, the fundamental relatedness of the image implies a new relational structure when visual forms are recontextualized within different closed systems. In particular, this seems appropriate when discussing the visual feedback loop, as it likens the visual and the physical.

More broadly, Deleuze and Guibaud claim that what is commonly considered specific to the medium of cinema is, in fact, incorrect. Cinema, as an experienced form, is not simply the technology of film nor its technological affordances, i.e. motion, photorealism, etc. Cinema is instead a series of formal and phenomenological criteria that exist outside (possibly above) of these material notions. While this seems a matter of semantics for cinema, this is quite profound when considering forms that exist across and without particular technologies. Again, we arrive at the visual feedback loop.

This revised definition of a medium can easily be confused with the concept of *medium specificity*—a term used to qualify a unique set of features from a particular technology as the medium's teleology. For instance, one could argue that relatedness is specific to the medium of cinema, while the potential for photorealistic representation is not; therefore,

cinema is defined solely by relatedness. Deleuze and Cubitt make it clear that such a reading is too narrow—representation contributes to relatedness¹ as much as relatedness contributes to representation.² Likewise, for transient forms, medium specific is wholly inaccurate. Instead, the theories of Deleuze and Cubitt claim cinema is a *desired form*—that is, a uniquely experienced and produced object.

Now, the under-articulation of the visual feedback loop generally stems from how the discussion and analysis of media privilege materiality and technology. As a result, in order to accurately define the visual feedback loop, one must surpass its transience and create a flexible mold to categorize the form abstractly. Namely, I offer that visual feedback loop is desired form.

⇔

¹ With regards to Edwin S. Porter's *Pan-American Exposition by Night*, Cubitt states "The moving figures give the composition depth and scale, but they distract from the apparatus of the pan. Organizing the single shot to produce unity through exclusion of offscreen space implies the possibility of alternate views: a reverse pan, insert edits to identify the figures, or cutaways to the emblematic searchlight. Meanwhile, the foreground figures also introduce the possibility of seeing from other points inside the figured space: point-of-view shots and reverse angles to complete the description of the world of the film. [...] The unification of the shot leads mercilessly to the proliferation of cuts."; Cubitt, 48.

² Deleuze writes, "[Alain] Robbe-Grillet's work testifies to the power of the false as principle [to the] production of images. [...] The images must be produced in such a way that the past is not necessarily true, or that the impossible comes from the possible. When Robbe-Gillet appeals to the detail which falsifies in the image (for instance, *The Man Who Lies* should not have the same suit and tie several years later), we see that the power of the false is also the most general principle that determines the relationships in the direct time-image. [...] *The Man Who Lies* is one of Robbe-Grillet's finest films: this is not a localized liar, but an unlocalizable and chronic forger in paradoxical spaces."; Deleuze, *Cinema 2: Time-Image*, 131-132.

Definition: the desired form

The term *desired form*³ is defined as follows:

- (1) A set of formal conditions related to the order and arrangement of physical elements.
- (2) A set of sensible phenomena related to the order and arrangement of experiential elements.
- (3) The formal set and phenomenological set are mutually arising; the existence of one set necessarily implies the existence of the other.

The desired form defines to a both the material and immaterial portions of a medium. The necessity of this term comes from frequent essentialization of media. The total formal and phenomenological set tend to be distilled into generative subsets of elements. Such a set, mathematically speaking, contains the elements that under the operation or operations of the larger set can recreate the entire set. This means the larger set can be pared down into that which is the bare minimum—elements can be discarded if they are only operative combinations of other elements. The notion of a desired form asserts that the whole set of elements is the only subset of those elements, that is, the trivial subset. To find a generative subset of elements within a form means either (1) the form is not a desired form or (2) the subset is, by definition, non-equivalent to the desired form.

Hence, essentializing a medium into a smaller set of experiential or formal aspects can only be seen as an affront to the expressed form itself. For example, in cinema, if the moving image is simplified into merely (mechanical) representation, it denies a

³ In choosing the term form rather than medium, I want to draw the attention away from the definition of a medium as a means of transmission. While this definition is accurate, it pigeonholes a medium into being understood as a substrate in/on which communication takes place. Form emphasizes the composite whole that is divisible only for the purpose of taxonomy.

distinction between the profilmic and the photographic. Both could essentially represent the same thing, i.e. visual verisimilitude. A true desired form must be *well-defined* in the mathematical sense—the final product implies a single and unambiguous means of production. The well-definition of the desired form can be represented as (3): $(1) \Leftrightarrow (2)$.

While the term desired form allows us to speak of the visual feedback loop as set of conditions that are not tied to a particular technology, the term gains worth when considering modes of remediation and technologically-exclusive media theory (such as cinema's original material apparatus). As media become more and more distant from their technological constraints, the necessity to speak of the technologically-absent medium—that is, the desired form—will become more necessary.

The form and materiality of the feedback loop

Feedback can be generally defined by the circumstance where the output of a system is used (at least in part) as input for that same system. Feedback refers to output-as-input and the loop refers to the systemic closure that exists when output is used as input. In a more general sense, the feedback loop constitutes a causal structure, where the system functions based on previous functioning. The result is structure that is reflexive and recursive—the current state is inductively derived from lifespan of the system as well as indicates the (potential) outcome of the system. "Feedback loops [have] long been exploited to increase the stability of mechanical systems"⁴ as an inborn method of self-

⁴ Hayles, 8.

regulation. Since the invention of video, feedback loops have included visual output-as-input. The visual feedback loop also allows for self-regulation, albeit a different type.

We will consider the visual feedback loop as a desired form; it will be broken down only for taxonomic purposes. The separated components cannot represent or reproduce the function of the whole loop, as Rosalind Krauss claims about video feedback.⁵

Furthermore, the aim is to develop specific terminology that avoids invocations of inadequate or antiquated media theories. The scaffold that the thoughts of Deleuze and Cubitt provide is a structural analogue for the purposes of introducing and grounding the importance of this theory in media traditions.

As Hyun-Jean Lee's thesis outlines, the feedback loop is comprised of a series of components.⁶ Lee identifies four varieties of the feedback loop⁷—the physical loop, the electronic loop, the code-level loop, and the psychological loop. These varieties of the loop can be generalized into a set of three components:

- (1) The input device
- (2) The processing device
- (3) The output device

⁵ Rosalind Krauss. "Video: The Aesthetics of Narcissism." *October* 1, no. Spring (1976): 50-64.

⁶ Hyun-Jean Lee. "The Screen as Boundary Object in the Realm of Imagination." (Georgia Institute of Technology, 2009.), 6-10.

⁷ Lee, 7.

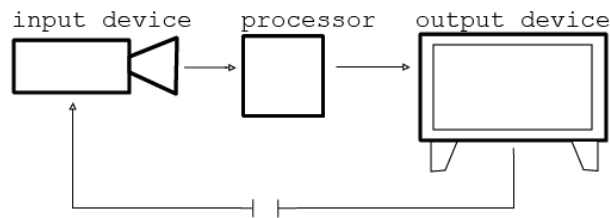


Figure 3: Basic visual feedback loop

(1) The input device receives information. Data enters the loop from the outside. In this act of reception, the feedback loop generates an inward vector, or, more precisely, continues a one-way cyclic process. A video camera is a prototypical input device in the visual feedback loop. It acts as an eye by receiving in light through its digital aperture. While the properties of light do not change, the input device ostensibly transforms the usually omnidirectional light into a focused beam toward the camera. Hence, the sensible world before the input device is always directed at the input device (from the point-of-view of the system).

(2) The processing device takes the real-world information and translates it into a new digital format. The light perceived by the video camera becomes encoded as a video signal or information array. The light is digitized through the processes of sampling and quantification.⁸ First, the image is broken down into discrete parts. Next, each part is assigned a set of values to represent the original information. Despite the process of digitization,⁹ the actual methods of sampling and quantizing vary based on the encoding format.

⁸ Manovich, *The Language of New Media*. 28.

⁹ Manovich, *The Language of New Media*, 28.

(3) The output device takes the quantized data and re-presents it. The now-digital information is displayed as an image. The processing device digests the input so that it may be in an acceptable format for the output device. The output device assembles the data, such as arranging pixels on a screen.

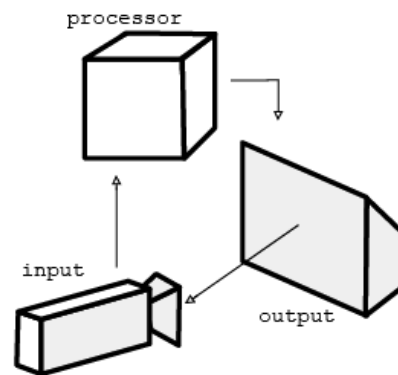


Figure 4: Three-part visual feedback loop

These three components exist in the four different types of loops Lee categorizes. Since the focus is on the visual feedback loop, the input and output devices are almost universally a digital moving-image camera (e.g. video or webcam) and a screen (e.g. television or projector & screen), respectively. The processing device can vary tremendously, from a simple video graphics array (VGA) to a computer processor.

While Lee's categories are helpful in speaking of the parts of the feedback loop, they illustrate an essentialized approach. Her explanation of the psychological loop, for instance, illustrates a misunderstanding of Rosalind Krauss' claim that feedback is a "'bracketed' situation".¹⁰ By this, Krauss means to place a person both physically and psychologically within the physical loop. The spectator-user acts as an intermediary by participating in the loop process. Hence, the psychological loop is always a subset of the physical loop as the physical loop provides the condition for the psychological loop. Lee, on the other hand, claims:

"[M]ost importantly, all the loops described [...] fall under a more intensified psychological loop because of the real-time interactivity between the interactor and the system [...] The directly mirrored feedback and the exact mirroring effects keep the system closed and the viewer self-absorbed. In this situation under real-time feedback, there is little room for subjective reflection on the interaction."¹¹

The psychological loop, according to Lee, exists as the outside the physical loop either in parallel and concurrent or enclosing the physical conditions.

This separation of material and immaterial conditions allows Lee to claim the screen interface of the feedback loop provides the definite characteristic of the loop itself.¹²

Instead of the loop being the final product, it provides a circumstantial context for real and virtual worlds to fluidly interact. The reflexive, durable, and directional situation of

¹⁰ Lee, 7.

¹¹ Lee, 7.

¹² Lee contextually defines interface as the medium in or on which the real and virtual (Lee's "imaginary") collide. In the case of the psychological loop, the person forms the boundary object, while for physical loop the screen does.

the loop is discounted for the transformative and immersive qualities of the interface (which are, for all intensive purposes, achievable without feedback at all).

In response to these issues, I offer few amendments. The first of these is that the loop's bracketed situation—i.e. requires and includes a person—is only consistent when discussing the loop as an formal experience and not as a physical condition. The standard three-part loop can have an optional fourth component, a person, to close the loop and begin a durable experience. The three-part loop results in a static form that is cut-off from duration for the sake of external meditation (this explored in 3.1 through Nam June Paik's *TV Buddha*). The loop exists either unto itself as a three-part system or with a person as a four-part system.¹³

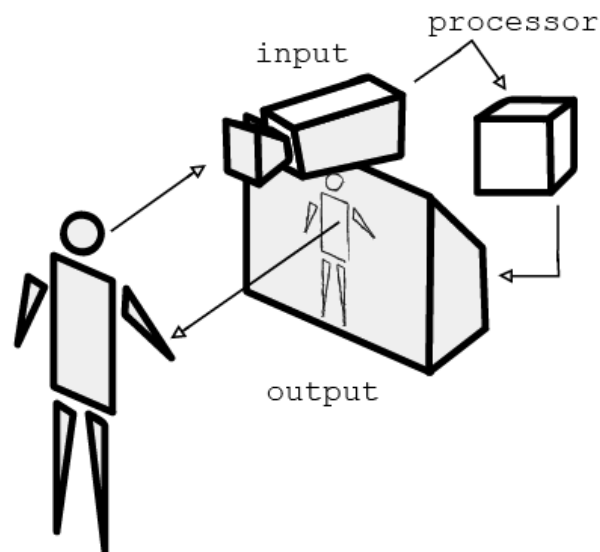


Figure 5: Four-part visual feedback loop

¹³ We will see the former begs for the latter. The three-part loop is a conceptual entity since it requires duration, and so a fourth part, to be validated as exhibiting the phenomena of visual feedback.

The phenomena of visual feedback

The four-component feedback loop establishes a complex set of cognitive and physical circumstances. These circumstances are outlined as follows:

/External homogeneity

The visual feedback loop has four-components. As a living-body being-in-the-world, the fourth component—the person—is able to bear witness to the three-component loop without yet being included; the person can elect to enter and exit the loop. While on the outside, the feedback loop is not fully realizable. From an external vantage point, the loop exhibits a particular set of characteristics.

Externally, the loop denotes the static *material* notion of feedback. The three-components are visible, and so comprehensible in their functional worth. One can inspect these elements, their functions, and their relative positions. Thus, the loop is treated as a static (non-living) body through our ability to objectify and dissect it. It does not need to act as a feedback loop (taking in output-as-input) as much as appear to act as a feedback loop. Externally, the visual feedback loop is a conceptual object.

In this static state, the loop processes nothingness infinitely. A single moment, as much the singular physical space, is comprised of a series of moments that are trivially identical, that is, reflexive. Borrowing from Bergson, the loop expresses temporal homogeneity because of a lack of distinction amongst moments.¹⁴ The loop's internal time can only be experienced externally; hence, time can only be measured. Again, the loop is

¹⁴ Henri Bergson. *Duration and Simultaneity*. Translated by Leon Jacobson. New York: Bobbs-Merrill Company, Inc., 1965. 41.)

externally conceptual since it exists in full without relying on an execution. The production of output-as-input is irrelevant since distinguishing input from output is impossible. The loop is closed and can be symbolized as a directed circle moving through the input device and processor, and out of the output device. This external homogeneity forms how we identify with our augmented experience once inside.

/Extended perception and augmented self

Once entering the loop, the spectator-user is confronted with a pair of viewing subjects. Sobchack explains the similar experience in film as the negotiation of viewing. The spectator views the screen which is, in fact, the result of what the camera has viewed. The acceptance of this schizophrenic encounter—the viewing-view/viewed-view—is a precondition to being able to experience cinema. While the two views unfold together, they are separated in time; the spectator perceives the view of the now-absent camera. Hence, the I/eye unites subjects spatially—the self with the image before it—and temporally—the self with the image antedating it.

The feedback loop relies on a similar concept. In visual feedback, however, the two viewing subjects exist simultaneously; that is, the feedback loop relies on a viewing-view/viewing-view. This is a fundamental axiom of the visual feedback loop—as the subject views, so too is the subject being viewed. Both perspectives are co-temporal while being distinct in space. One viewed object—the output device—demands a second viewed object—the person. This moment fixes a relationship of positions and perspectives, and initializes distributions of power within the loop.

Once a person enters, the joint viewing extends perception. A pair of embodied and hermeneutic relationships proceed:

forward viewing-view: physical self→virtual self

reverse viewing-view: virtual self→physical self

Where the negotiation in film is that of the camera and the viewer as distinct perspectives and times, the negotiation in feedback is a re-placing of one's self physically and virtually; this is a consequence of the actual and perceptual concurrence of subjects. The directed circle (the static notion of the loop) is divided in half: one portion points to the virtual self (the forward viewing-view or the forward arc) and one half points to the physical self (the reverse viewing-view or the reverse arc). The total self, as a result, is constantly in flux—onscreen and offscreen, staring in and staring out. Once a person begins negotiating selfhood, time is no longer solely measured, but inhabited; the homogeneous moment vanishes.

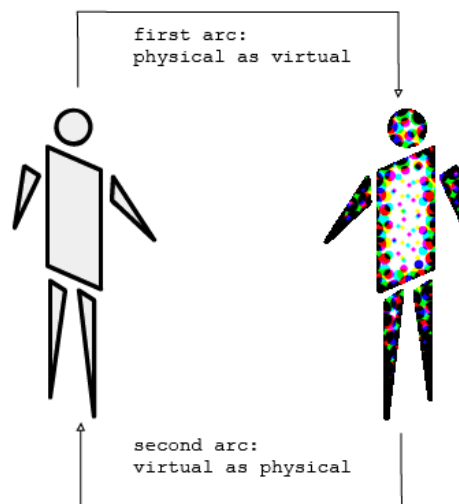


Figure 6: Dual Arcs

The two arcs rely on a combination of the perception-image and the actual-image. In the former, perception leads toward action; in the latter, perception leads toward recollection. By seeing the self, the loop constructs both a perception-image and an actual-image; the perceptive act relies on both sensory-motor and recollection schema. The forward arc pairs the living-body with a virtual double; as the spectator-user is physically aware, the screen visually over-determines corporeal awareness. Visibility constructs the visual/virtual self; conversely, visibility reconstructs the physical self. The reverse arc returns visual representation into the acting physical body. The spectator-user, as visually constrained, forms embodied versions of visibility.

The visual feedback loop erects a crystalline identity by refracting singular moments and spaces.¹⁵ The entwined selves leads each durable moment into duplication: one which is physical; one which is virtual. As time refracts, so follows space. To understand the virtual self, the spectator-user must correlate the visual world to the physical world.

/Internal heterogeneity

While external duration is trivially homogeneous (each moment is the same moment), internal duration is truly referential, regressive, and heterogeneous. Once a person elects to enter the loop, the physical and virtual selves mutually arise. The refracted identity refracts time. The viewing person and the viewing camera each reflect and reverberate the current moment differently. The former embodies time, while the latter represents it; and the spectator-user experiences both. "[T]he time that endures is not measurable,

¹⁵ Deleuze, *Cinema 2: The Time-Image*, 69.

whether we think of it as within us or imagine it outside of us."¹⁶ The spectator-user cannot compare the two moments as the measurement of the moments is completely different; viewing leaves a residue on each moment. Simultaneous experiences of the same moments are, instead, two distinct moments existing co-spatially and resulting from a singular origin (the "impersonal and universal"¹⁷ moment). The acceptance of technological augmentation leads to the understanding of this fracturing precisely.

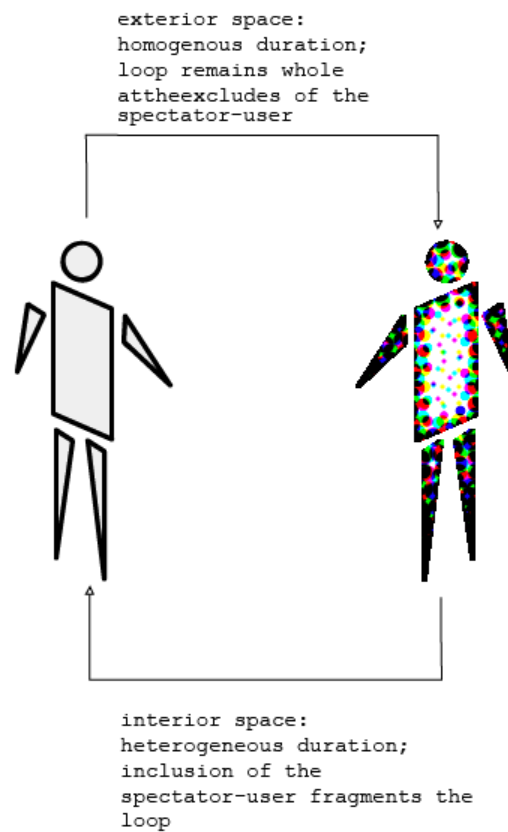


Figure 7: External homogeneity/Internal heterogeneity

¹⁶ Bergson, 49.

¹⁷ Bergson, 49.

/Contiguous space

Similar to time, space is similarly made crystalline. The virtual world and physical world come from the same origin—the externally knowable space. Inside the loop, the actual space transforms into two distinct world. The virtual world imbues the physical world with new constraints—boundaries, impediments, etc. Likewise, the physical world imbues the virtual world with a sense of geographic place. The continuousness of natural space is partitioned by way of the two arcs. Continuity is replaced with contiguity—worlds are juxtaposed to form a spatial pastiche. Reframing, in film, unifies disparate perspectives into a coherent space. The contiguity of looped space excludes the outside world, making the amalgamated space self-contained and closed.

⇒

Now that the visual feedback loop has been outlined as a desired form, we move to a series of case studies that illustrate particular aspects of the definition. The first set of examples explores the aesthetic distinction between external and internal duration. The next set explores the two arcs and how they arrange concepts of power. The final example explores notions of space, as well as the practical applications of visual feedback loops.

CHAPTER 3: ARTIFACTS

3.1: Video

The main advantage of the term desired form, as previously mentioned, is that formal and phenomenological sets are well-defined. So, no matter the underlying technology, one general definition applies; this does not, however, presuppose that the affects of a particular technology are inconsequential. Instead, a specific materiality adjusts the relative weight of each feature to privilege some and dampen others. Though it may seem that this is a concession for essentializing one portion of a medium to preserve another, there are two reasons why this makes sense in the age of digital media.

First, technology tends to change; often times, it does so quickly. A computer, for instance, (seemingly) enters obsolescence almost as soon as it enters the market—its processor grows slow and its memory becomes insufficient when compared to the newest product. The desired form hurdles the obstacle that a medium—that is, a means of transmission—loses its relevance and is replaced. The desired form turns a medium, which is bound to material execution, into a conceptual object, namely, a weighing schema. The formal framework—for us, the input device, the processor, output device, and spectator-user—is stripped of its concrete and inflexible matter. In a new alchemy, matter is transmutable and resists change. Hence, the final product is never an factor of whether a specific device, material, or process is part of the production. The desired form treats a medium as conceptually concrete.

The exchangeability of technologies within a medium is, in fact, a condition we already implicitly accept; cinema provides a prime example. The various film gauges (e.g. 16mm, 35mm, 70mm, 70mm IMAX) all produce what we call cinema.¹ They are selected for various reasons, including low light conditions, resolution quality, and color spectrum, and produce very different effects. Even more, recent filmmaker, such as David Lynch for *Inland Empire* (2006), have begun to use high-definition digital cameras.² Unlike traditional film cameras, digital cameras encode light as data rather than viewable image.³ The limiting factor is not the size of a reel, but the capacity of a hard drive. *Inland Empire*, despite the huge difference in material execution and technological detail, is considered a work of cinema (even, a work of film since it was later transferred onto film for projection in theaters). Cinema, as Cubitt and Deleuze expound upon, is a combination of formal and experiential qualities, and not a technology. Cinema resists obsolescence by continually embracing technological change that fulfills its formal and experiential criteria.

Second, a desired form side-steps the distinction between media and non-media. The term *medium* implies a lineage of usage, practice, and aesthetics where newer forms are met with hesitation. Furthermore, *medium* privileges information transmission, thereby

¹ David Bordwell and Kristen Thompson. *Film Art: An Introduction*. Seventh ed. (New York: McGraw Hill, 2004.), 6-7.

² Lynch used Sony's DSR-PD150; "Inland Empire: technical" <http://www.imdb.com/title/tt0460829/technical>. (accessed 20 Feb 2010)

³ One can not look directly at the recorded information to see the image for it must be digitally recombined. Arguably, the same can be said about for film, as the film stock must be developed in order for the images to be viewable. The main difference is that the information being recording in digital cameras is never intended to be seen directly. Just as the video signal does not represent that which it is encoding, the information of the digital image corresponds to the viewable image as much as the shape of a letter or sequence of letters corresponds to the idea being communicated. That is, there is always a decoding process that relies on a system which is not about the visual product but about the information itself.

rendering the form transparent at the cost of its illusion. Alternately, the term makes a strong claim for a how technological processes manifest an experience. For instance, the cinematic experience that Sobchack describes (i.e. dependent on the cinematic apparatus⁴) does not translate to home viewing. The DVD player attached to a television is not a new medium, but it is also not the traditional means of viewing cinema. The desired form avoids this tediousness by only considering the abstraction of technology. A technology is only one means of generation, and so the desired form is *materially exchangeable*.

These two implications make the desired form (and specifically the visual feedback loop) technologically transcendent. This chapter will focus on the various incarnations of the visual feedback loop. It is always important to keep in mind that the artifacts rely on the conceptually concreteness and materially exchangeability to exemplify the characteristics of the visual feedback loop. From these two facets, the visual feedback loop can be understood as more than a circumstance of technology and situation from technology.

Homogeneity and *TV Buddha* (1974)

*TV Buddha*⁵ by Nam June Paik is a clear, and often referenced, example of the visual feedback loop. Paik created numerous video installations ("video sculptures"⁶ as Paik

⁴ Sobchack, 169.

⁵ 1974, Amsterdam; John G. Hanhardt. *The Worlds of Nam June Paik*. (New York: Guggenheim Museum Publications, 2000.), 129.

⁶ David Ross. "A Conversation with Nam June Paik." In *Nam June Paik: Video Time–Video Space*, edited by Toni Stooss and Thomas Kellein, 56-65. (New York: Harry N. Abrams, Inc., 1993.), 58.

called them) involving visual feedback loop, such as *TV Rodin (Le penseur)*,^{7,8} *TV Chair*,⁹ *Video Buddha*,¹⁰ and *Three Eggs*.¹¹ *TV Buddha* from 1974 in Amsterdam, is described in the catalog listing as a "[c]losed-circuit video installation with bronze sculpture; black-and-white, silent; dimensions vary with installation."¹² It is composed of a video camera situated above a small television monitor. The camera is aimed toward the bronze statue of Buddha. The statue faces the monitor and camera as if watching the television image of itself. The processing device, housed within the camera, converts light into video signal for direct interlaced display. Despite the relative stillness of the artwork, the video feed is live.

When asked about *TV Buddha*, Paik explains:

"Most likely the quick success of my *TV Buddha* was because it was what the young generation was looking for, a protranscendent [*sic*] aesthetic. When you see the so-called dancing pattern device of my early video circuit (a self-invented electronic device), it was all slowly repeating patterns—all nongravity motion [...] It was soothing and sweet. In a way, TV was a logical progression, because it's sweet due to the repetitive visual thing."¹³

⁷ 1974/1976, Stuttgart; Ross, 56.

⁸ 1982, New York; Hanhardt, 127.

⁹ 1976, Cologne; Ross, 61.

¹⁰ 1989, Stuttgart; Ross, 63.

¹¹ 1981, New York; Hanhardt, 128.

¹² Hanhardt, 129.

¹³ Ross, 57-58.



Figure 8: Nam June Paik, *TV Buddha* (1974)¹⁴

Where some of Paik's works expose repetition within the image, *TV Buddha* reveals repetition in a different sense. *Demagnetizer*,¹⁵ for instance, employs magnets to distort the cathode ray. Repetition is visible in the image—lines curve, shapes twist, and interlacing flutters. Alternately, *Global Groove* makes repetition systematic and syntactic; video feeds are blended, overlaid, and left and rejoined. Sequences act like visual leitmotifs. *TV Buddha*, however, represents repetition non-visually, or, at least, non-perceptively. *TV Buddha* manifests architectural and conceptual repetition. The spectator sees no change, despite witnessing a live video feed. Repetition is reflexive as opposed to reflective; visual, spatial, and temporal forms are not duplicated or reproduced, but equated.

¹⁴ "Nam June Paik, *TV Buddha*." *ZKM Center for Art and Media*, <http://www.medienkunstnetz.de/works/live-taped-video-corridor/>. (accessed 20 Feb 2010)

¹⁵ Hanhardt, 118-119.

Chris Meigh-Andrews sums up Paik's video work as "partly relying on the juxtaposition of the familiar domestic television into an incongruous physical situation [...] The images on the screen are often simple, repetitive and graphical, even perhaps of secondary importance, simply reinforcing or complementing the physical structure."¹⁶ Meigh-Andrews highlights the importance of physical architecture to Paik's work. The loop is as much in space as it is a space. *TV Buddha* demonstrates the essential physicality of visual feedback. Paik quarantines the loop by raising it above the ground, thus reinforcing "the act of mediation [...] as a hybrid [to be] treated much like a physical object."¹⁷ Space becomes partitioned—*TV Buddha* divides the gallery space into exterior and interior with regards to the loop. The raised podium sterilizes the interior space by eradicating the possibility of anyone truly entering the loop.

Despite pinpointing how space complements visual forms, Meigh-Andrews grossly simplifies Paik by generalizing his works as "playful or deliberately ironic".¹⁸ On the surface, *TV Buddha* places a statue of Buddha in front of television to expose the tension between the mindfulness mediation and the mindlessness of watching television. Even more, the gaze of the Buddha is juxtaposed with gaze of the camera to deflate modern meditation as simply mediation. More appropriately, *TV Buddha* is sincere and reverent; visual feedback does not attempt to smear tradition, but bolster it. The perceived irony of *TV Buddha* comes from a lack of understanding of the distinct formal and

¹⁶ Chris Meigh-Andrews. *A History of Video Art: The Development of Form and Function*. (New York: Berg Publishers, 2006.), 252.

¹⁷ Bolter and Grusin, 59.

¹⁸ Meigh-Andrews, 252.

phenomenological features of visual feedback. John G. Hanhart hints at the underlying complexity by saying "The buddha silently *observes* himself on the screen in an infinite temporal loop as the monitor/camera links the contemplative figure with the process of its production and reception."¹⁹

Speaking more generally of video artists (Paik included), Michael Rush begins to explain why irony fades after first blush:

"[T]he spontaneity and instantaneity of video were crucial. Video recorded and revealed instant time, whereas film had to be treated and processed. According to [Dan] Graham [a contemporary video artist of Paik], 'Video feeds back indigenous data in the immediate, present-time environment. Film is contemplative and "distanced"; it detaches the viewer from present reality and makes him a spectator.'²⁰

The immediate reflection of video compared to the contemplative distance of film is at the center of the misreading of *TV Buddha*. In a typical viewing situation (that is, one that does not involve visual feedback, such as film), the statue occupies (in space) the position of the spectator and subject; the television and camera occupy the position of the spectacle and object. The distinction of roles relies on a distance in space, which *TV Buddha* enacts, but denies. The television image is an image of the spectator—the virtual Buddha and physical Buddha exist simultaneously in time—rather an image from the spectator. In this latter case, the mode of production of the image is inconsequential to the image as representation. The nuance is that the latter situation divorces the spectator's action—i.e. viewing—from the system's action—i.e. crystallizing time and space. Where the viewing-view/viewing-view exists in the former (and actual situation), the viewing-

¹⁹ Hanhardt, 127.; emphasis mine

²⁰ Michael Rush. *New Media in Late 20th-Century Art*. (New York: Thames & Hudson Inc., 1999.), 83.

view/viewed-view exists in the latter. To qualify the *TV Buddha* as simply assembling Buddha before its image negates the active function of that assemblage.

In actuality, the image results from the physical situation, and is so bound to the statue *being* before the camera and television. While distance exists between the statue and the statue's image, the distance is purely physical; both statue and image are co-temporal (again viewing-view/viewing-view). For the image to arise, the statue must remain in front of the camera. From the exterior, statue and image are resolutely static as the subject/object is inanimate. Like actual mediation, *TV Buddha* relies on constant presentness—being is never expanded to future or past beings. The unwavering physical situation pairs with concept of an unwavering mental state. *TV Buddha* proclaims technological transcendence. Externally homogeneous time equates each moment to the same moment—now.

The external homogeneity of the loop acts as a null relation. Henri Bergson explains,

"There is only one motion, we said, which is perceived from within, and of which we are aware as an event itself: the motion that our effort brings attention. Elsewhere, when we see a motion occur, all we are sure of is that some change is taking place in the universe. The nature and even the exact location of this change escape us; we can only note certain changes of position that are its visual and surface aspect, and these changes are necessarily reciprocal. All motion—even ours as perceived from without and made visual—is therefore relative."²¹

Bergson states that external understanding of absolute motion is impossible since an observer can only be singularly embodied, and therefore unable to be non-relative. Later,

²¹ Bergson, 39.

he extrapolates this idea to lived experience, namely duration (*durée*). He suggests that any claim of understanding of experience (just as the true nature of motion) is a function of surface projection and empathy. The perception of experience is either an external (and so impersonal) measurement of time or a projection of internal (and so relativistic) duration. The perception of experience is then nothing more than a function of one's own duration, and so inaccurate and imprecise. Bergson implies an inverse postulate: if we cannot note change, then even our perception of duration shifts to a measurement of time. *TV Buddha* functions under this complex discourse—stasis is non-change as much as imperceptible change.

The interior time of the loop is closed from external viewing. The spectator remains a spectator, and is never allowed to be a user with regards to the loop in *TV Buddha*. Hence, the sculpture forces the audience to consider a physical situation (the loop as a structure) as a embodied duration (feedback as an action); Bergson asserts the impossibility of this. The internal reality (heterogeneity) of *TV Buddha* is reduced to an external perception (homogeneity). Perpetual exteriority obfuscates the directed arcs and rendering them indecipherable; the physical self and virtual self exist, but only as objects to the audience. One can watch watching and observe observing, yet never be watched and be observed. The loop is fixed, and therefore contrived, as an experience. The relation of statue to image is null—sameness through absence of embodied comparison.

Heterogeneity and *Live Taped Video Corridor* (1970)

Live Taped Video Corridor by Bruce Nauman technically consists of "wallboard, video camera, two video monitors, videotape player, [and] videotape [with variable dimensions]." ²² The video camera is placed over the entrance of the narrow corridor. At the opposite end of the corridor are the two television monitors. One television displays the live feed (closed-circuit video) and the other displays a looped video tape of the empty corridor from the camera's perspective. Nauman explains:

"I used a wide-angle lens and it was above and behind you as you walked into the corridors, so you were removed by yourself, sort of doubly removed—your image of yourself was above and behind, and as you walked, because the wide-angle lens changes the rate that you're going away from the camera, so as you took a step, you took a double step with your image. It's a strange feeling. [...] [W]hat you have very obviously in that situation is two kinds of information. You have the information that you've given yourself walking down this space, and then the other information through the camera visually. You have a piece of visual information and a piece of kinetic, or kinesthetic, information and they don't line up [...] That's what the piece is, is that stuff that's not coming together." ²³

²² 1970, New York; Michele De Angelus. "Interview with Bruce Nauman." In *Please Pay Attention: Bruce Nauman's Words*, edited by Bruce Nauman and Jane Kraynak, 197-295. (Cambridge: The MIT Press, 2003.), 263.

²³ De Angelus, 264.



Figure 9: Bruce Nauman, *Live Taped Video Corridor* (1970)²⁴

As Nauman points out, *Live Taped Video Corridor* presents the spectator-user with disjointed information. Nauman focuses on the disconnect between the live feed and live action, while neglecting to comment on the disconnect between the taped feed and the live feed. The disconnect Nauman describes truly begins at the monitors, and particularly when the feeds are compared. Until a spectator-user reaches the monitors, the installation exists as a whole; the two monitors split that world into outside and inside. The taped feed displays, what can only be called, the external perspective—time is frozen and space is isolated. The disconnect emerges from the other monitor—the interior perspective.

²⁴ "Bruce Nauman, Live-Taped Video Corridor." *ZKM Center for Art and Media*, <http://www.medienkunstnetz.de/works/live-taped-video-corridor/>.

The homogeneity of the external perspective presents feedback as a directed circle. The spectator-user is simply a spectator in a single embodied relationship to the loop:

physical self (as subject) → feedback loop (as object)

The feedback loop is directly perceptible as a structure (sensory-motor schema), yet indirectly perceptible as a duration (sensory-perceptive schema). The taped feed paradoxically allows such a removed perspective only from within the corridor. Since the taped feed does not require inclusion, it can be considered the external perspective. The juxtaposition of the live feed emphasizes curled dimensions and surreality of the tape. The external point-of-view is neither true nor false; instead, the taped feed is unverifiable. Situating the past emptiness within the present fullness of the corridor generates a dual simulacrum. The simulated past space and the simulated absent space become more than real the actual past and true absence since the latter can not witnessed directly; the tape codifies the past and the absent by way signifying it as non-present. The homogeneity of external duration emanates from this distinction—the current state of the corridor reveals the non-current state.

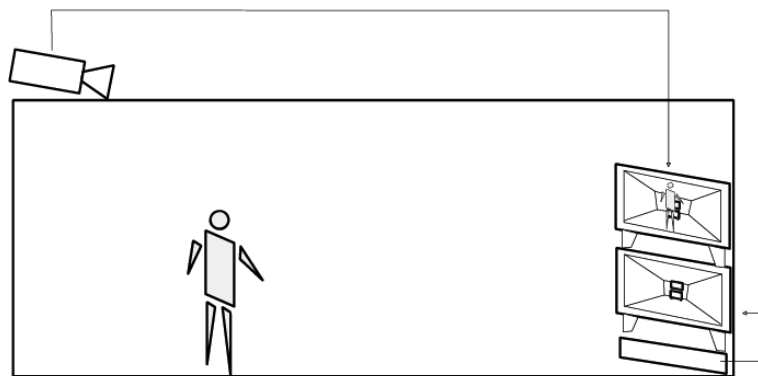


Figure 10: Live Taped Video Corridor diagram

The interior perspective of the live feed breaks the loop into two arcs. First, gazes are distinguished; this is the augmentation of sight. The spectator-user, in being made a visual object, differentiates the embodied gaze from the hermeneutic gaze. As a result, the structure of the feedback loop falls into indirect perception so that the duration of the loop can be directly perceivable. The single embodied relationship to the loop transforms into a dual relationship within the loop, namely:

feedback loop:

$$\begin{array}{c} \text{physical self (as subject)} \rightarrow \text{virtual self (as object)} \\ + \\ \text{virtual self (as subject)} \rightarrow \text{physical self (as object)} \end{array}$$

As the taped feed presents a simulacrum, the live feed presents a paradox. The arcs reveal an uneven distribution of power. While the forward arc positions the virtual self as object, the reverse arc reveals the virtual as its own visual subject *and* object. Primarily, the paradox arises from Nauman's use of a curved lens; the physical self as object vanishes at the moment of objectification. Secondly, the paradox arises from the position of the camera. While the spectator-user comprehends her own objectification, it cannot be verified—turning toward the camera; that is, assuming the role of object; annihilates subjecthood. So, the physical self disassociates with the virtual self (selves).

Experientially, the arcs appear distorted:

$$\begin{array}{c} \text{physical self (as subject)} \rightarrow \\ \{ \text{virtual self (as object/subject)} \rightarrow \text{virtual self (as object/subject)} \rightarrow \dots \} \end{array}$$

The result is not reflective or reflexive, but regressive and parenthetical. The physical self and virtual selves maintain a fixed distance (the distance between camera and monitor).

Moving closer to the screen does not move the virtual self away as much as the virtual

self moves away. Nauman claims that the visible and experiential components do not line up; on the contrary, the two experiences align all too well. The virtual selves vectorize physical motion by translating remove. A similar vectorization occurs to the space itself.

Typically, visual feedback divides space equally—half physical, half virtual. *Live Taped Video Corridor*, however, infinitely and equally partitions space. The contiguous world—the fabricated space of the visual feedback loop—reduplicates the same fixed-width corridor. As the contiguous space is made visible, it is also made non-traversable; just as the physical space, it is restricted and bounded by the width and breath of the corridor. *Live Taped Video Corridor* transforms space into a discernible, yet infinite pattern.

⇒

TV Buddha and *Live Taped Video Corridor* present the aesthetics of looped duration. Despite their differences, these two works reveal a similar truth about visual feedback loops. Time is fundamental to how the loop functions. Paik manipulates time to spatialize mediation; Nauman manipulates time(s) to disorient our notion of the present (and being present). This leads to an important question: does the visual feedback loop use a timeline? Alternately, does the visual feedback loop *time out*? The answer deals more with user experience than phenomenology (which I will not go into here).

Simply, the answer is yes. The visual feedback loop eventually loses its audience. Depending on the interaction, the timeline changes. The changes come, at least in part, from the power structure of the loop (discussed at length in the next section). When a spectator-user is given minimal agency, the experience seems to shrink. In the case of *TV*

Buddha, the complete lack of agency with(in) the artwork reduces the timeline down to nothing, allowing one to claim the piece is a work of conceptual art. The following section, in exploring the interactive mirrors of Daniel Rozin, implicitly offers that more comprehensive forms of agency change the length of the timeline. However, the goal of this work is to illustrate rather than prescribe. Therefore, it is out of place to offer solutions for extending the timeline outside of those implicitly suggested by the artifacts.

3.2: New media

The spectator-user of visual feedback assumes numerous roles: subject, object, agent, observer, etc. These roles determine and predetermine a great deal about various characteristics of our definition, viz. the relative weights of the individual features result, in part, from the scripting of the spectator-user. While I have asserted that the visual feedback loop does not depend on its materiality to be a desired form, materiality certainly impacts perceptions, thereby staging different power dynamics. Specifically, visual feedback loops with little agency (such as *Live Taped Video Corridor* and *TV Buddha*) rely on a vertical hierarchy; the spectator-user observes and is observed, but has no ability to change observation. Thus, verticality engenders technological or *a priori* privilege. Inversely, visual feedback loops with more agency (such as Daniel Rozin's physical mirrors) tend toward horizontality; the physical self exists in an exchange with the virtual self. Thus, horizontality demonstrates a relational aesthetic between the spectator-user and the work.

Generally, visual feedback explores the tension amongst a series of binaries: observation and surveillance, object and subject, audience and voyeur. In *Live Taped Video Corridor*, for instance, the graininess of early video cameras and black-and-white televisions sire visual claustrophobia (exacerbated by the confines of the corridor itself) and menacing panopticism (foregrounded by the intervention-less power structure).¹ The loop structures the spectator-user's revelation: to see implies to be seen. In this revelation, the spectator-user unearths a truth in an archeological fashion: the corridor stands as a monument to the

¹ Dörte Zbikowski. "Bruce Nauman." In *Ctrl [Space]: Rhetorics of Surveillance from Bentham to Big Brother*, edited by Thomas Y.; Frohne Levin, Ursula; Weibel, Peter, 64-67. (Karlsruhe: ZKM Center for Art and Media, 2002.) 66.

power/nature of things. *Live Taped Video Corridor* suggests an inverse form of experience which is inductive.

A continued analysis of *Live Taped Video Corridor* sheds light on the mechanisms that create its deductive and vertical logic. Dörte Zbikowski writes,

"Nauman repeatedly creates new situations that focus on engendering uncertainty. Though the camera assumes the role of the observer, what we see are only sections, so the person observed becomes their [*sic*] own observer. What comes into play here is the tension between what the observer knows and the manner in which it is experienced."² Furthermore, in "Nauman's work, the viewer has unwittingly become part of a series of experiments."³

Zbikowski suggests that Nauman's works rely on *a priori* hypotheses. In the case of *Live Taped Video Corridor*, the spectator-user unknowingly enters into a situation with a single outcome. Embedded in the fact the loop is an entered situation is a Cartesian (*a priori*) model of space.⁴ The loop awaits, occupying the same space with or without the spectator-user. Observer-as-(self)observed requires a simultaneous experience of embodiment and disembodiment; and each body—physical and virtual—inhabit distinct locations in space. The disembodied and augmented self, in turn, gains privilege as it provides literal and figurative oversight of the physical perspective and body, as well as being united with the pre-existing structure. In this, the loop strips the spectator-user of agency; one can neither invert nor rearrange power because the loop as a space is fixed.

² Zbikowski, 67.

³ Zbikowski, 67.

⁴ This is opposed to Gottfried Leibniz's view of space. He defines space as that which is derived between the relation objects. The following section explains these concepts in more detail. For our purposes here, it matters that the Cartesian model denotes the pre-existence of space.; Michael R. Curry. *Digital Places: Living with Geographic Information Technologies*. (New York: Routledge, 1998.), 24-32.

As much as the spectator-user becomes a component in the feedback loop, the physical body is positioned below the virtual body. This is what is meant by a vertical arrangement.

Nicholas Bourriaud defines an alternate arrangement of elements along a horizontal axis; he calls this a *relational aesthetic*. It is defined as "an art [aesthetic] that takes as its theoretical horizon the sphere of human interactions and its social context, rather than the assertion of an autonomous and *private* symbolic space"⁵ and, more loosely, "a form of art with intersubjectivity as its substratum".⁶ Bourriaud continues to explain,

"Art (practices derived from painting and sculpture and displayed in the form of an exhibition) proves to be an especially appropriate expression of [the] civilization of proximity. It compresses relational space, whereas television and books send us to spaces where we consume in private; and whereas the theater or the cinema bring small groups together to look at univocal images, there is in fact no live commentary on what the theatre or cinema audience is seeing (the time of discussion comes after the show). [Relational aesthetics] create free spaces and periods of time whose rhythms are not the same as those that organize everyday life, and they encourage an inter-human intercourse which is different to the 'zones of communication' that are forced upon us."⁷

Relational aesthetics, then, are enablers of communication; Bourriaud limits this dialogue to the spectators of the art in a flexible region before the art (something that Nauman's work denies through architecture as much as technology). Hence, relational artwork acts as a locutory by constructing a space for interpersonal conversation.

⁵ Nicolas Bourriaud. "Relational Aesthetics." In *Participation*, edited by Calire Bishop, 160-71. (Cambridge: The MIT Press, 2006.) 160.; original emphasis

⁶ Bourriaud, 161.

⁷ Bourriaud, 161.

To amend this idea, I propose that Bourriaud's *inter-human intercourse* be called an *interlocutory intercourse* to allow dialogue amongst the spectator and the work. In this fashion, the artwork and the spectator are horizontally arranged. For the visual feedback loop, space becomes dialogical as the space of the loop is generated between to the physical self and virtual self. Where one enters into Cartesian space, relational space only exists because of the spectator-user. So, the visual feedback loop grows organically from the spectator-user's presence (i.e. does not exist *a priori*). Beforehand—that is, from the external vantage point—the homogeneity of duration can be attributed to the conditional nature of the loop's existence (recall that the static external reflection engenders a homogeneity of duration in *TV Buddha* and *Live Taped Video Corridor*).

The relational aesthetic reconsiders the aura with regards to art.⁸ Daniel Rozin's physical mirrors demonstrate how this shift in power allows for a seemingly unique experience.

The physical mirrors of Daniel Rozin

Hidden augmentation

All of Daniel Rozin's physical mirrors rely on similar components. A digital video camera takes visual data and coarsely digitizes it by utilizing a fraction of the possible resolution and only greyscale values. The greyscale values of each pixel correspond to the actuation of Servo motors controlled in real-time by a computer processor. The processor additionally detects proximity and only allows actuation when something is within range. The motors reside behind the mosaic-like output surface and are attached to

⁸ Bourriaud via Félix Guattari uses the term deceptive aura to define a unique experience with(in) a work; Bourriaud, 170.

one of the physical pixels. For example, a motor in *Peg Mirror* rotates a single peg to produce a differentiation in lighting on the angled face. When a person stands within range of the mirror, the computer processes the digital video images and adjusts the motors. The relative changes in the tone or color of each pixel through actuation produces a recognizable virtual counterpart. Important to this recognition is that the mirror's movement occurs quickly to allow visual confirmation of a physical action ("When I move to the left, my 'reflection' does too.") and physical confirmation of a visible action ("What I see in front of me is my motion").



Figure 11: Daniel Rozin, *Rust Mirror* (2010); exterior state⁹

⁹ "Daniel Rozin *X by Y*, Jan 23 - Apr 10." <http://www.bitforms.com/current.html#id=136&num=5>. (5 Apr 2010)

The mirrors stand in stark contrast to many new media works by disguising the technology that is actually on display. Rozin explains about his piece *Wooden Mirror*:

"In many ways, this is the essence what we try to do here: taking the power of digital computation and concealing it to see how it influences something more in touch with the human condition. Wood doesn't want to be very digital, each tile is slightly different. But computation can take all this randomness and messiness and put it into an order. [...] The piece is on the line between analog and physical vs. digital and computational."¹⁰

As new media artifacts, the physical mirrors present a case for how digital processes relate to non-digital things. The mirrors lay bear how digitization reconstitutes the physical body. The body is broken down, transformed into data, sequentially reorganized, and made computational and computable. The body-as-data is taken a step further and playfully reconstituted in data as visual-and-visible body. Here, the virtual self is a physical object that occupies real space as much as the physical self is a conceptual object that occupies virtual space. The realms of real and virtual are dually populated—existing in tandem and in parity across the divide.

¹⁰ Daniel Rozin. "Wooden Mirror", <http://fargo.itp.tsoa.nyu.edu/~danny/mirror.html> (13 Feb 2010)



Figure 12: Daniel Rozin, *Rust Mirror* (2010); interior state¹¹

Equally-weighted arcs

As previously mentioned, certain interactive feedback tends toward horizontality. This is both a phenomenological and structural characteristic. In order for the feedback loop to allow for a dialogue between, say, physical actions and virtual (and visual) actions, the augmented perspective must not be encapsulate a higher order of observation. This concept is explained as follows:

"In order for something to be made observable at all, other things [...] drop out of the same observation [...] Formulated in terms of logical concepts: the [first-order] observer is the excluded third of his observation; he [sic] is not the 'subject', he is the 'parasite' [...] of his observing... When a second observer sees what the first does not see—thus, when he observes an observer observing—this is called second-order observation [...] [A] second-order observation is also a first-order observation, which results in a paradox,

¹¹ "Daniel Rozin *X by Y*, Jan 23 - Apr 10." <http://www.bitforms.com/current.html#id=136&num=5>. (5 Apr 2010)

since it is simultaneously something and something else [...] Every second-order observation shares the fate of the observation that it is observing—as long as it is observing it is not transparent to itself. For that, a higher order of observation is required, and so on."¹²

The necessity of higher orders of remove stem from how subjectivity is typically formulated, where "self-consciousness"¹³ stands diametrically opposed to subjecthood. To remove self-consciousness, higher-order observation and the invested power of the observation system must also be removed. When the subject and object are balanced, the physical subject acts unselfconsciously since the subject-as-object is also the object-as-subject.

Sight in the feedback loop, as previously outlined, exists as a pair of arcs. The forward arc points toward the virtual self (here, the pixelated reflection); the reverse arc points to the physical self. The former visual confirms and correlates physicality, viz. the virtual self visualizes what the physical self does. Deleuze explains this concept in cinema as the time-image. Spaces (i.e. the real and the virtual) become correlated through perceptive connections; causality relies on imagistic association. The physical self is knowable as it is visible and visual, and the output becomes the signifier of the physical action. Hence, the virtual self as visualized physical self provides meaning through its imagehood.

Deleuze posits that this form of association is divergent as it causes the spectator to bridge the gaps between discrete parts. In cinema, the spectator connects sequential

¹² Christian Katti. "Systematically" Observing Surveillance: Paradoxes of Observation According to Niklas Luhmann's Systems Theory." In *Ctrl [Space]: Rhetorics of Surveillance from Bentham to Big Brother*, edited by Thomas Y.; Frohne Levin, Ursula; Weibel, Peter, 50-63. (Karlsruhe: ZKM Center for Art and Media, 2002.) 52-57.

¹³ Katti, 57.

perceptions as metaphors. In visual feedback, the spectator-user connects the virtual self to how the physical self is seen. In other words, the virtual self visually codifies one's embodied perception of disembodiment.

The reverse arc is the physical confirmation of the visual. Again recalling Deleuze, this concept in cinema is known as the movement-image. Spaces become correlated through a sensory-motor schema; causality relies on imagistic physics (visual perceptions have visible actions). Causal relationships reside purely outside the body of the subject (recall that in the reverse arc the subject is the virtual self). Hence, images converge by constructing relating discrete parts. In cinema, the spectator abstractly constructs lived space (contiguity becomes continuity) by following relationships. For instance, a shot of a hand pressing doorbell followed by a shot of another person looking through the curtains relates actions and reactions within a single space. In visual feedback, the spectator-user constructs a singular space that juxtaposes the visible/visual and the embodied/physical. Contiguous regions replace the smoothness of real space. Physical causality issues out from the visual image to the physical self. The forward arc rasterizes the physical self and reconstitutes it on the substrate of the output device. The reverse arc remodels the virtual self to substantiate it as a physical body.¹⁴ Colloquially, the former corresponds to the statement "I see what I am doing"; the latter "I do what I am seeing".

The physical mirrors allow the two arcs to exist with equal weight. This is due to two factors. First, the feedback loop extends forward to include the spectator. The forward arc

¹⁴ Camille Utterback and Romy Achituv's *Text Rain* provides a perfect example as people change their motion to collect virtual letters

formulates the rasterizes body as a unique, necessary, and *a posteriori* substrate. Without a person in range, the space before the mirror does not exist alongside a virtual space. The spectator-user is a catalyst of duration and spatiality. Secondly, the reverse arc is fully decoded as physical. In *Live Taped Video Corridor*, the virtual self never fully assumes a physical form in the spectator-user (as demonstrated by the disassociated regression diagrammed in the previous section). A physical mirror, on the contrary, acts as a counterpart or mime. The output device offers another first-order observation. What is seen in the mirror is not simply the virtual self, but a response to the physical self, thereby avoiding self-consciousness. Although both physical and virtual selves are both subject and object vis-à-vis one arc, the subject-as-object never emerges as the result of the full loop. The feedback loop here exhibits a fundamental horizontal exchange.

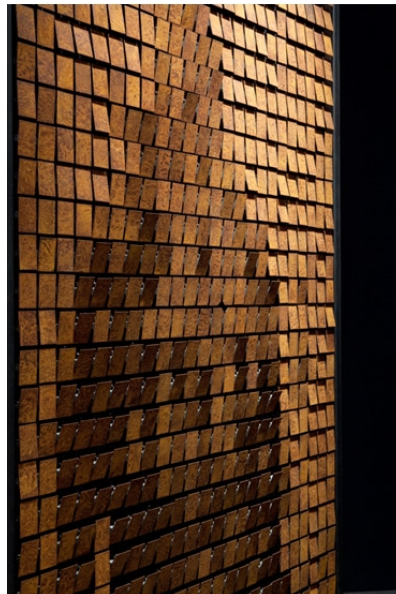


Figure 13: Daniel Rozin, *Rust Mirror* (2010); detail¹⁵

¹⁵ "Daniel Rozin *X by Y*, Jan 23 - Apr 10." <http://www.bitforms.com/current.html#id=136&num=5>. (5 Apr 2010)

External and internal, revisited

Externally, the feedback loop appears not to exist. When no one is within range, the mirrors throb and ripple as if playing alone. There is no outward indication that proximity will change that behavior. The mirrors seem anthropomorphically content. While externally-static loops await entry, dynamic feedback loops await existence. This does not mean that external homogeneity is non-existent as well. Instead, the mirrors remain in a pre-temporality (as well as pre-spatiality and pre-causality) when seen from the external vantage point.

The external homogeneity of duration always relies on a conceptual closure. In video feedback loop (such as the absent screen in *Live Taped Video Corridor* or the eternal present of *TV Buddha*), the external duration lacks distinction because it lacks change. The moments reverberate as a single *moment*; time is frozen. In Rozin's work, the conceptual loop exists invisibly. As the physical space extends outward upon entry, it contracts upon exit; likewise, time contracts. The external and internal states function conditionally:

```
loop(){
    if(someone is close){//mimic}
    else {//play alone}
}
```

The null condition (i.e. no one is near) creates a divergent series akin to the eponymous Deleuzian idea—(machine) perception leads toward an internal, rather than spatial/causal, state.¹⁶ Deleuze defines the divergent series as coming from the legibility

¹⁶ Deleuze, *Negotiations, 1972-1990*, 53.

of time-images as opposed to the visibility (and so convergence) of movement-images. Legibility, just as in written text, refers to an act of deciphering. The visible movement-image concretizes the abstract (as in showing how perception leads to an action); the legible time-image abstracts the concrete (as in showing how a perception relates to other perceptions). Similarly, the divergent conditions of the mirrors turn perception toward subsequent perceptions, constantly checking circumstances. In this way, both space and time are cyclic. The reverberated moment stemming from a convergent series vanishes—what is seen by the camera is not outwardly manifested. The mirror appears self-contained; it requires neither the presence of another for defining a space nor the being of another for defining a time. In other words, causality is absent; in its void arises external homogeneity.

Once within range, the mirrors register the spectator-user and the contracted space-time unfolds. The self-contained work transforms into a social work. The feedback loop emerges fluidly; this is what is termed the deceptive aura. A shared and differentiable time, i.e. heterogeneous duration, begins. The mirror makes a clear connection to the unique and present being. The form seen by the spectator-user is not simply a bodily shape, but her bodily shape. The actuation of the motors is an extension of being—a kinetic manifestation of a living-body being-in-the world.¹⁷

¹⁷ In truth, any number of people and non-people could produce the same humanoid outline. But, in a way the mirrors define a play space where individuality matters. Johan Huizinga explains: "Here, then, we have the first main characteristic of play: that is it free, is in fact freedom. A second characteristic is closely connected with this, namely that play is not 'ordinary' or 'real' life. It is rather a stepping out of 'real' life into a temporary sphere of activity with a disposition all of its own."; Johan Huizinga. "Nature and Significance of Play as a Cultural Phenomenon." In *The Game Design Reader: A Rules of Play Anthology*, edited by Katie Salen and Eric Zimmerman, 96-120. (Cambridge: The MIT Press, 2006.), 103.



The previous two sections have outlined the a variety of visual feedback loops within the art. The following section explores how visual feedback loops work in a practical context.

3.3: GPS navigation

The previous two sections explicate the capabilities and flexibilities of the visual feedback loop; in all the examples, the artifacts have been artworks. This raises an important question:

Does the visual feedback loop serve any purpose outside the context of art?

Simply, the answer is yes. Visual feedback (as well as non-visual feedback) prominently structures a large portion of current technologies. Recall N. Katherine Hayles' statement about feedback loops in the practices of engineering. Discussing the governor (a device for controlling revolutions per minute in a steam engine), Hayles makes clear that practical feedback loops are best employed by devices for systemic self-regulation.¹ Systemic self-regulation takes on a different meaning in the case of visual feedback since the loop appeals to the faculties of interpretation. And, just like the governor for the steam engine, practical visual feedback loops work synergistically within a larger device or context. For the system to work properly, the loop must be masked and rendered invisible by utility. When the functioning of the feedback loop is made directly perceptible, its ability to regulate a system is compromised as is the system as useful. Visual feedback as an artistic form highlights the underlying issues disregarded and hidden in everyday uses. To look at these artistic practices, one can clearly conceive of the loop as a form since the practical concerns are removed. In other words, the previous examples illustrate the characteristics and formulations of visual feedback directly. These uses, however, do not preclude the practical uses or imply that no such uses exist.

To review, the visual feedback loop is comprised of four components: input device, processor, output device, and person (whom I call the spectator-user to emphasize the roles of subjective observer, objective participant, and, as we will see in the next chapter, active receiver-decoder). The four-part structure leads to a series of experiences: external homogeneity, internal heterogeneity, visual augmentation, parity arcs of information flow, and contiguous constructed space. The combination of these two sets constructs the visual feedback loop as a desired form—a medium-unspecific information circuit. Where art lays these traits bare, practical devices cloak them.

A prime example (maybe the quintessential example) is the mirror. For the light mirror, the input device, processor, and output device are one-in-the-same, the mirrored surface. Light travels between the mirror and the spectator-user's eyes, and is processed in the least possible way by being directly reflected. But, just as the simplest video feedback loop, the mirror constitutes a form of mediation, albeit a practical one—subjectivity sprouts from the mirror's materiality. Perspective, however, is consequential, and the mirror image is seemingly derived from a pre-technological and unmediated condition. The object's surface is all the object has to offer; there is no apparent depth, no inner-workings, no mechanisms. No matter, the mirror is subjective and does mediate perception.

Unlike *Live Taped Video Corridor* and Daniel Rozin's mirrors, a light mirror is not designed to highlight its fundamental flaws. Instead, the mirror as an object of mediation is pushed aside for the virtual self as the (un)mediated object. To look at a mirror is to not

see the mirror at all, but to experience the mirror's conditions; the mirror presents verisimilitude by calling attention to the virtual self as simply verisimilar. In those moments when the limitations of the mirror's perspective appear, the mirror no longer works. The mirror only serves the aim of seeing that which cannot be seen, and if there are still things that cannot be seen by/with the mirror—say, the back of one's head—then the mirror serves no purpose. That is, a mirror must disappear to practically exist; if it appears due to its limited practicality, then it is made obsolete.² This duality is what haunts the visual feedback loop in practical circumstances.

As a desired form—that is, as a set of circumstances and not a materiality—the visual feedback loop vanishes when looked to for some other purpose than being looked at. Moreover, when the loop is employed for its utility, it is done so to never be looked at at all. Where film or video are materials as much as structural and experiential modes, feedback is only the latter. In film, an idea—inward-looking—arises when the contents of the cinematic image become all that the cinematic image is. The visual feedback loop in more practical realms suffers from this disregard, but does not have the recognizable materiality that film does.

The aim of this chapter is to identify how the visual feedback loop as a desired form provides its practical applications with something more than internal structure. In order to do this, I will explore GPS navigation systems for automotive travel. The goal is to pinpoint what the GPS navigation systems as feedback loops offer other than real-time driving instructions.

² *Live Taped Video Corridor* exploits precisely such a tension.

Background: GIS and GPS

Geographic information systems (singular acronym, GIS) identify a wide variety of technologies and approaches associated with computer-aided geography and cartography. While no singular definition of these systems exists, John Pickles identifies two features shared amongst the various definitions—"the role of digital electronic data and the production of electronic spatial representations of those data: GIS is a product of computers in particular and of electronic information technology more generally."³

A subset of global information systems are global position systems (singular: GPS). GPS is a "system of radio-emitting and -receiving satellites used for determining positions on the earth [by using] trilateration".⁴ GPS exclusively deals with placement, and relies on other global information systems to accomplish the combined goal of navigation.

GPS navigation units present an ever-growing example of visual feedback—partially because of the practicality of the feedback loop itself and partially because of the manner of representation of the self and space. Although there exist numerous varieties of GPS navigation units, I will focus on the car dashboard models and specifically the Garmin Nüvi. The selection of the Garmin Nüvi is due to its relative uniformity to other

³ John Pickles. "Representation in an Electronic Age: Geography, GIS, and Democracy." In *Ground Truth: The Social Implications of Geographic Information Systems*, edited by John Pickles. (New York: The Guilford Press, 1995.), 3.

⁴ Tasha Wade and Shelly Sommer ed. *A to Z Gis: An Illustrated Dictionary of Geographic Information Systems*. (Redlands: ESRI Press, 2006.), 91-92.

dashboard navigation units (as seen above) as well as it as part of a continued series, indicating longevity of visual form and data structure/system.

Technical description

The dashboard GPS navigation unit relies on a complex system of visual feedback. Unlike the previous examples, the input device for a GPS unit is not a camera. Instead, the input device is the internal receiver that indicates one's current location. The receiver, in actuality, retrieves data based on an array of satellites that calculate the receiver's current location. As an input device, it acts as a marker. The spectator-user initially selects a destination. A server processes the current location to form a navigable path based on GIS data and mapping algorithms.⁵ The screen presents up-to-date directions and real-time instructions to the spectator-user. The instructions guide the driver and the ever-changing position guides the updated display and directions. Changes from the proposed path by the driver result in a new set of directions and a different path.

A claim for the practicality of visual feedback

Dual augmentation

Driving with a navigation unit creates a doubling of hermeneutics. Physically, the world is mediated by the car. Perspective onto the world is that of looking through the near-rectangular windshield. The roadway is felt through the tires, suspension, and chassis. Movement is not direct either. To steer the car is to rotate the steering wheel; to go forward, to push the accelerator. The physical self already exists as machine mediated.

⁵ For example, a greedy algorithm progressively selects the largest-valued node to form a connected path to the destination. Values are determined by a set of criteria, such as speed limit, distance, or traffic.

Virtually, the world is mediated through the navigation device's screen. One's current location is identified by an arrow on the screen.

The physical and virtual self are both represented by proxy. In the real world, the person and car become tautological; on the device's screen, the self and the arrow are equated. To experience the world in any fashion is to experience the world through a machine's perception. The augmented self is no simply the embodied I combined with the visible machine eye. Instead, the embodied I is encased in the car which is then represented on the screen. To find one's current location is to accept the car as surrogate in the physical world and the arrow as surrogate the virtual world. The navigation device precisely relays the overlooked hermeneutics of driving: to move in a car is to move as the car, and it is to assume the machine's vector in space. The arrow does not belabor the complexity; the virtual self is both an avatar (the arrow as object) and a perspective (the arrow as direction).

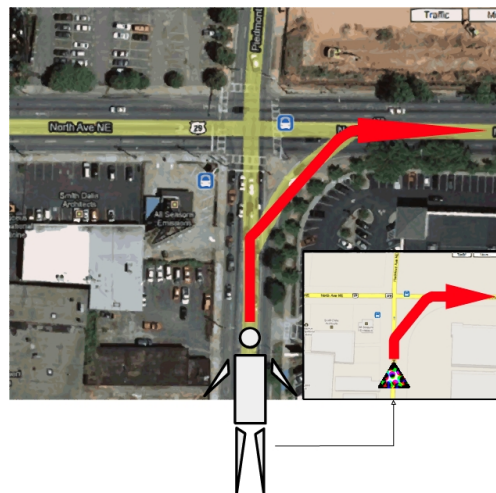


Figure 14: GPS dual arcs

The absolute and the relative

Space is often described in two general ways. The first is the Cartesian model; this model relies on a concept of absolute space. "[W]e often think of geometrical space as a real space, where the points are characterizable in terms of some metric, and the points are simply locations in that previously existing space."⁶ In this model, space is "conceptualized as a large void"⁷ that is filled with unrelated objects. This space, therefore, exists *a priori* and has no connection to the objects that fill it.

The alternate model is Leibniz's model. "[F]or [Gottfried] Leibniz, space does not exist as a separate entity, a container, but rather exists only in the relationships among objects".⁸ Location is only determined by the occupying object, and distance comes from the distinction (the trivial co-relation) of objects. To speak of space in terms of Leibniz's model is to refer to a collection of objects as much as their relationship(s). Spatiality is then a synonym of interrelation (or, in Deleuzian terms, relatedness). Likewise "temporality and causality"⁹ are applicable for describing relations between objects, but not an object itself. Furthermore, a position in space is determined relatively—reference points are objects as well and not absolute fixtures.

⁶ Michael R. Curry. *Digital Places: Living with Geographic Information Technologies*. (New York: Routledge, 1998.), 25.

⁷ Curry, 25.

⁸ Curry, 27.

⁹ Curry, 27.

The second model—Leibniz's relative model—implies a particular sense of personhood, which Immanuel Kant highlighted by explaining that "the concept of [*a priori*] space is built into us"¹⁰ and we impose it on the world because we are prone to attributing it to objects in the world. The revelation is that as much as spatiality, temporality, and causality are attributable to the relationships of objects, they are also attributable to people as objects, and, even more, to the self as a constant (relative) object. While Michael Curry claims that in this Kant debunks the Cartesian model,¹¹ it seems obvious that he provides cohesion between the two models—the self-as-relative and the self-as-absolute is a matter of embodiment and subjectivity. From a personal perspective, space begins from the first known object, the self. The distinction between the absolute model and the relative model is a matter of semantics to Kant.

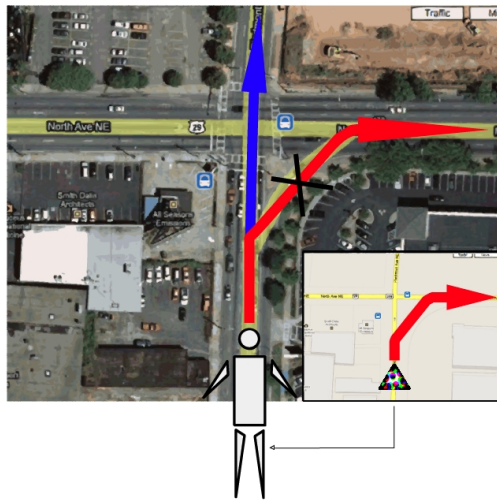


Figure 15: GPS broken arcs

¹⁰ Curry, 27.

¹¹ Ending a discussion of the Cartesian model in the methods of designer Christopher Alexander, Curry explains that "[t]he world emerges from this pattern of interrelationships" and that the Cartesian model emerges as an artifact of the knowable world of modernism; Curry, 32.

GPS navigation plays out this difference between absolute and relative space by way of its dual arcs. The forward arc of feedback imbues a sense of relative space; the reverse arc, of absolute space. On the screen, the arrow does not appear to move through space as much as have space form around it. Remaining fixed in the center of the screen, the digital world moves around the virtual self. The visual landscape is constructed by virtual landmarks that use the iconography found in digital maps. Larger roads are shown as yellow lines; smaller roads, as white. Parks are green patches amongst undifferentiated tan planes. Relevant signs (interstates, construction zones, etc.) appear as floating icons. The iconography appears only to disappear; nothing (other than the arrow) remains for long. Spatiality begets temporality. The flux of time—the estimated time of arrival as calculable derivative and as inductive value (due to, say, traffic)—punctuates the fleeting spatial co-relationships of icons. Visual position results from the where and when the icons appear in the frame.

Conversely, the physical confirmation of the visual space turns flexible icons in to fixtures. As the GPS device directs the driver to turn, it uses distance measures ("Turn right in 300 feet"). Poaching from Henri Bergson's reading of time, a measurement of time formulates homogeneity—each moment of equivalent measure is equivalent. Bergson attests this denies that time is experienced, and so equal measurements of time vary in experienced duration. Likewise, distance measurements un-differentiate space: between here and there are only a number of units. Hence, the device converts Leibniz's relative space into Cartesian absolute space when the physical body rasterizes the virtual body. To reach a destination is a matter of covering unitized space rather than moving

from one landmark to another. The second arc disregards the localized iconography; the relationships of objects are abstracted as measurements and then dissolved as programmatic physical motion.

Of course, the absolute becomes the relative when the reverse arc moves into the forward again. Approaching a destination means shifting and switching iconography. Yellow lines, white lines, and green patches grow and shrink, and are unitized.

In the case when the physical and virtual worlds do not align—say, in the circumstance of recent road closure—the feedback loop is exposed. That is to say, the spectator-user becomes aware of the mediated-ness of the experience. The onscreen directions ("Continue on Main Street.") are incongruous to the directly perceivable reality. The contiguity of the constructed viewpoints breaks down; instead of convergent subjectivities (the loop as a whole being a bidirectional exchange), the arcs diverge. Each reality points to its own solution. Of course, the physical outstrips the virtual. When finally the physical solution is played out (say, taking a detour) does the arcs re-converge.

⇔

Now that we have seen how it functions in a practical setting, we move on to explore the impact of the visual feedback loop on notions of information and mediation. To foreground this next section, we need to recall the core assumption of this desired form, namely, that the visual feedback loop does not require a materiality to exist.

Consider the medium of a book. Though it can be defined as physical printed of text, it can equally be defined as a recognizable text format. The latter definition exceeds materiality, grouping physical and digital texts together. While we can point to an ordinary format of a book, digitized texts question our notion of what constitutes a medium. *Is a digital book a different medium than a physical book?* One may claim, digitization makes a text reconfigurable, transferable, and procedural; the combinatorial literature of the Oulipo certainly counters this. Even more simply, a physical text can be changed insofar as one can scribble, tear, and distort the pages. If the claim is that the digital book and the physical book are instances of the same medium—a book—then what defines a medium?

Moving back to the visual feedback loop, which has no technological genesis, what constitutes the coherent grouping of *Live Taped Video Corridor* with the GPS navigation unit? The answer is certainly not a materiality. Then, one must wonder, what characterizes the origin of a form if not its stable encoding?

CHAPTER 4:

MEDIA AND REMEDIA

4.1: A death in media theory

To reiterate, the visual feedback loop, though exploited in various forms and with various technologies, lacks articulated by previous media theories. Amending this oversight demands two things:

- (1) Establish an initial criteria for identifying, discussing, and critiquing the visual feedback loop (specify a theory of the loop)
- (2) Reconcile visual feedback as a theoretical concept with existing media theory (expand and amend existing theories)

Until now, the focus has been on the first objective; this chapter focuses on the second. To review, visual feedback loops define two mutually-arising sets: one that is formal and one that is phenomenological. The well-definition arises from a preceding discussion of theories of the essential relatedness of the moving images. To be blunt, relatedness does not characterize visual feedback because it is visual; simply poaching visual relatedness from moving images results in summations, such as the output device is a boundary object¹ or (video) feedback manifests narcissism.² Instead, relatedness characterizes visual feedback because, like the moving images, visual feedback exists as a direct result of *morphisms*—transformations that preserve traits. In cinema, the morphisms result in concepts of causality, spatiality, and temporality, as well as abstract notions of metaphor; the residue of an image can be found in other images. To make sense of visual feedback

¹ Hyun-Jean Lee. "The Screen as Boundary Object in the Realm of Imagination."

² Rosalind Krauss. "Video: The Aesthetics of Narcissism."

is to recognize all points as counterpoints. The physical self and the virtual self depend on each other; the virtual implies physicality, and the physical implies virtuality.

In Deleuze's definition of cinema (as much as Cubitt's), relatedness constitutes being, that is, relatedness is an ontological rather than an epistemological condition. Abstractly, images act as mathematical elements. A mathematical element, by definition, always relates to the whole ($a, b \in S$) and to other elements (the simplest example: $\forall a, b \in S, \exists R \ni aRb : \{a \neq b\}$ or $\{a = b\}$). In these terms, moving images *correspond*—the framed denotes the unframed; a sequence continues an action; a shot disrupts time. Relatedness is both outward (between distinct elements, such as how the cut relates shots) and inward (between an element and a whole, such as how the affection-image relates to the movement-image). Moreover, there is no way to escape relatedness.³ For Deleuze, the ontology is resolutely metaphysical; relations construct the figurative movement and time of image-objects. For Cubitt, the ontology is distinctly concrete; relations construct the literal movement and time of images.

The concept of a desired form champions this duality. The visual feedback loop, for example, is composed of concrete mechanisms—input device, processor, output device, and spectator-user. It is also composed of abstract mechanisms (phenomena)—notions of internal and external duration, arcs of information, the construction of space, etc. As previously stated, a material instantiation of a visual feedback loop recalculates the weights of the underlying mechanisms. As the desired form remains constant, the

³ While Deleuze focuses on the moving image, he means image in far more general way. The movement-image and time-image are the visible projections of movement and time onto film. What we see is only one set—the visible/visual set—and not the pre-image of kinetic embodiment of movement.

material form, i.e. the medium, is always in flux. In other words, the visual feedback loop exists across media as a circumstance of technologies. Grounding this relationship between a desired form and a medium is a specific notion of what constitutes a medium.

Desired form as reception and decoding

The common definition of a medium comes from the transmission model of information, also known as the Shannon-Wiener model. In this model, the medium is a container of and for information. Adopted wholesale during the Macy Conferences on cybernetics, the Shannon-Wiener model provides a universal quantification of information exchange. Its universality is not without a cost, namely the loss of the more comprehensive model offered by Donald MacKay. N. Katherine Hayles explains:

"[W]hereas Shannon and Wiener define information in terms of what it is, MacKay defines it in terms of what it *does*. The [first] formulation emphasizes the reification that information undergoes in the Shannon-Wiener theory. Stripped of context, it becomes a mathematical quantity weightless as sunshine, moving in a rarefied realm of pure probability, not tied down to bodies or material instantiations. The price it pays for this universality is its divorce from representation. When information is made representational [that is, dependent on the context], as in MacKay's model, it is conceptualized as an action rather than a thing. Verblike [*sic*], it becomes a process that someone enacts, and thus it necessarily implies context and embodiment. The price it pays for embodiment is difficulty of quantification and loss of universality."⁴

In terms of visual information, the Shannon-Wiener model defines the image as what it represents—what is seen, what is shown, what is implied, what is occurring, etc. For example, if one says "I see a dog walking" when watching a film of a dog walking, the person is saying that the information-as-mediated (encoded) is no different than the

⁴ Hayles, 56.; original emphasis

information-as-unmediated (direct). This model reduces the effects of mediation to signal and noise, allowing for the conceivable transmission and reception of the same information across multiple media. A medium can only offer disruption and ambiguity. Along these lines, the value of medium stems from its ability to negate itself--ostensibly able to disappear for the sake of information transfer. Therefore, the blame of any and all disruption is placed on the sender, since medial noise arises from encoding (the transferable quantity of information given noise) and not decoding (the context of reception).

Now consider the opposing model. "MacKay's model recognized the mutual constitution of form and content, message and receiver."⁵ To communicate relies on both what is said and in what context it is said. For example, to say "It is snowing" is obviously more valuable as a statement to someone inside and unaware than it is to someone outside and cold. Conversely, the same statement outside may function differently—say, as a joke—and communicate through its context and not its content. "The problem was how to quantify [this] model. To achieve quantification, a mathematical model was needed for the changes that a message triggered in the receiver's mind", a "staggering" problem.⁶ The rejection of the MacKay model in cybernetics for the simpler (and quantifiable) Shannon-Wiener model seems just. In fields where quantification is not a concern—specifically, media theory and critique—the Shannon-Wiener model is misplaced and misguided.

⁵ Hayles, 56.

⁶ Hayles, 56.

The MacKay model pinpoints how Deleuze and Cubitt understand a medium.⁷ While a medium surely encodes information, it more accurately characterizes a method of decoding information. Though I have pointed out the problem with Deleuze's disregard of the filmmaker (truly the formal practice of filmmaking⁸), his sentiment is clear: the desired form does not need to consider the encoder as a desired form results from decoding. Images must be processed *in situ*, making context a contributing factor to how and why information informs. The medium is content-in-context; this is what Hayles means when she says information is defined "in terms of what it *does*". Likewise, a medium is redefined from "a means of *transmitting* a message"⁹ to a means of *receiving* a message. That is to say, transmission must serve reception. Roland Barthes echoes a similar sentiment when he says "the birth of the reader must be at the cost of the death of the Author."¹⁰ For Barthes, the read text is all that matters; what has been intended by an author is inconsequential. Thus, meaning emerges from a process of decoding as the encoded information is unknowable (even to the author, as Mikhail Bakhtin describes in *The Dialogic Imagination*.¹¹)

The definition of a desired form deliberately avoids any claims of material and technological conditions. To attach such fleeting bodies to the definition returns us to a

⁷ Cinema as a desired form

⁸ This argument is found at the beginning of 2.2

⁹ Murray, Janet. "Medium Notes." http://www.lcc.gatech.edu/~murray/6210_medium_notes2.html. (accessed 1 Mar 2010); emphasis added

¹⁰ Barthes, Roland. "Image Music Text." New York: Hill and Wang, 1978. (accessed 4 Apr 2010)

¹¹ Mikhail Bakhtin. *The Dialogic Imagination: Four Essays*. Translated by Michael Holquist. Austin: University of Texas Press, 1981.

means of *transmission*. The desired form is instead a means of *reception*, a MacKay medium *per se*.

This is not just a reformulation of Marshall McLuhan's axiom "the medium is the message".¹² McLuhan states that "[t]he effects of technology do not occur at the level of opinions or concepts, but alter sense ratios or patterns or perception steadily without resistance."¹³ The internet, for McLuhan, produces a new concept of informational access, something that the information being accessed may or may not contain.

McLuhan's medium is defined as holistically effectuating—it does not inform, but reform. A medium assembles senses—sign language brings together motion and language through kinesthesia, for instance—and re-engineers their perceptive functions. Cinema privileges sight and sound, so cinema stratifies sight and sound above touch, smell, and taste; at times, cinema overlays senses in a synesthetic manner (such as the visualization of kinesthetic sensations in Stan Brakhage's *Mothlight*). Moreover, cinema (here McLuhan refers to Eadweard Muybridge's photographic experiments¹⁴) merges the mechanical and the organic, reforming the body as a partially mechanical *thing* and extending sight by way of machine. It is not important what is captured by Muybridge—a horse in motion—but that the camera allows the audience to see what was previously rendered invisible. The medium do not augment the body, as in the visual feedback loop, but adjust it. Though McLuhan astutely regards the context as important, he is cavalier in disregarding the content entirely.

¹² Marshall McLuhan. *Understanding Media: The Extensions of Man*. (New York: The New American Library, 1964.), 23.

¹³ McLuhan, 33.

¹⁴ McLuhan, 249.

On a spectrum of content and context, the Shannon-Wiener model exists on one end and Marshall McLuhan at the other; both deal with transmission. As a means of reception, a desired form never transmits information. Information can only be received, that is, decoded. The transmitted content and transmitting context are only informational; each acts as an information signal, but not as information itself. The signals only relate to the concept of an original form (i.e. encoded information) by way of an end product (i.e. decoded information). Hence, the informational signals relate to received information as a video signals relate to visual form—it is the decoding format that gives shape to what one perceives as the encoded information. Paik demonstrates this when distorting a television broadcast with magnets; Jean Baudrillard echoes the same idea in *Simulacra and Simulation*. Baudrillard writes:

"It is now impossible to isolate the process of the real, or prove the real. [...] [Real events] are now in some sense simulation [events] in that they are already inscribed in the decoding and orchestration rituals of the media, anticipated in their presentation and their possible consequences. In short, where they function as a group of signs dedicated exclusively to their recurrence as signs, and no longer at all to their 'real' ends."¹⁵

In the visual feedback loop, the virtual self relates to the physical self through representation and formulation. The spectator-user perceives visual likeness as a deductive fact of the mechanisms ("Since the input device leads to the output device, what I see must *be* me") and as an inductive fact of the phenomena ("Since I move and the image moves, the image must *be of* me"). The information of the feedback loop emerges when the spectator-user synthesizes content and context, that is, decides how to

¹⁵ Jean Baudrillard. *Simulacra and Simulation*. Translated by Sheila Faria Glaser. (Ann Arbor: The University of Michigan Press, 1994.), 21.

decode the informational signals. Content and context as transmitted information and encoded form arise only after decoding, and so point to an simulacrum rather than the any actual information or any actual medium. "Order, signal, impulse, message': all of these attempt to render the thing intelligible to us, but by analogy, retranscribing in terms of inscription [...] a dimension of which we know nothing."¹⁶

A death in media theory

The visual feedback loop illustrates the core of media theory through disparity—namely, that media theory defines transmission formats and not reception formats. Even in the most radical of cases (that being Marshall McLuhan, of course), media are disposed to top-down logic. A medium is that which encodes, transmits, begets. In one part, this logic comes from legacy of technologies that engender unique decoding. With digital technologies, these liquify. Huge swaths of desired forms fall under the umbrella terms of *new media* or *digital media* (Bolter and Grusin's concept of remediation comes to mind; it will be discussed in the next section). Can the videogame be grouped with the hypertext story anymore than digital film can be grouped with video? There are similarities in both cases; the differences are what matters.

In another part, this logic stems from people holding onto the material entity. People want to point to some expressed form, also denote how it came into being. Baudrillard pinpoints this with regards to news media.

"There is no longer a medium [he is speaking of television] in the literal sense: it is now intangible, diffused, and diffracted in the real [...] One must think instead of the media as

¹⁶ Baudrillard, 31.

if they were, in outer orbit, a kind of genetic code that directs mutation of the real into the hyperreal, just as the micromolecular code controls the passage from a representative sphere of meaning to the genetic one of the programmed signal. It is the whole traditional world of causality that is in question [...] one remains dependent the analytical conception of the media, on an external active and effective agent, on 'perspectival' information with the horizon of the real and of meaning as the vanishing point."¹⁷

A techno-medial myth pervades: the encoding and encoded information exist initially at one end, and the decoding and decoded information exist secondarily at the other end; this is simply untrue. Baudrillard understands that what we see on television, while we speak of it as such, is not transmitted information. Television exteriorizes and exploits an originary *notion* of its material components. From the assumption that television intrinsically fulfills a set of preconditions—it seems to fundamentally necessitate living/lived-bodies in living/lived-space—issues a notion of the Real. Television, as all media, performs—realizes—the process of encoding at the point of decoding; the latter does not simply reify the former, but generates the former. Baudrillard christens this "a fantastic telescoping, a collapse of the two traditional poles into each other: implosion—an absorption of the radiated mode of causality, of the differential mode of determination".¹⁸ One fabricates an origin in the act of witnessing an outward form (what could be called the origin's end). Decoding renders into existence both the encoded *and* the decoded.

While the transmission model certainly applies in some fields, it does not in media theory; it simply does not describe how a medium functions as a cultural entity, viz. a

¹⁷ Baudrillard, 30-31.

¹⁸ Baudrillard, 31.

desired form. A medium is what it does; and what it does is determined in reception. While a sender exists in some regard, the receiver is far more important; the receiver actively interprets and re-interprets to shape the desired form.

⇔

Now, what if the transmission myth were destroyed? Could we stop pretending the video feedback loop exemplified in *TV Buddha* and *Live Taped Video Corridor* has anything in common with video art in general other than maybe the camera and VHS tape?

The performance works of Bruce Nauman rely on a completely different aesthetic and genealogy than *Live Taped Video Corridor*. For example, *Walking in an Exaggerated Manner Around the Perimeter of a Square* (1967-68) denies the audience's inclusion in the performance. It structures a gaze at the screen as a spectacle, and disguises surveillance and augmented sight as observation and direct viewing. The video recording fixes the performance in space and time, allowing it to be replayed, reproduced, and distributed. One performance is indistinguishable from another; so, spectatorship becomes exchangeable. The camera exploits the tension amongst the mundane content and fixed perspective typical to television news broadcasts of the time, as well as cropping atypical of professional camera work. As a distributed piece of moving image, it denies any its status as commodity since it is conceptual (the name describes the piece's contents fully; watching it only confirms that fact).

Compare this to *Live Taped Video Corridor*. The video camera and screen are a portion of the piece. They do not depend of the aesthetics of television, film, or video; instead, *Live Taped Video Corridor* comes from traditions of installation art and architecture. Themes of surveillance, observation, panopticism, and vertical hierarchy come from the relationships of objects toward the subject. The experience depends of participation and physical presence. Documentation may capture the concept, but the concept does not replace the experience.

To consider these two works as exploiting the same medium seems obviously misinformed. Likewise, to consider, the visual feedback loop and video art as distinct mediums qua a means of transmission is equally as difficult. Video feedback and video art are distinguished by their desired forms—the unique sets of formal structures and phenomena. The desired form (that is, a categorical classification such as visual feedback) extends beyond the bounds of technology; it accounts for material expansion, technological reinvention, and digital revision.

Technology may always define what is called a medium; media theory, on the other hand, needs to move beyond this end. As all media move toward digitization, all technologies fall under one classification—the digital medium. Where does this leave hermeneutics that rely on the cinematic apparatus as composed of a projector and celluloid? Does Cinema disappear? Is a movie just a relic?

The desired form offers an escape in remedia.

4.2: A transcendence of form

Media definitionally burden visual feedback. One must constantly define, qualify, specify, and reaffirm how the parts interlock—*the visual feedback loop is a desired form; while material technologies instantiate this form, visual feedback cultivates a unique and technologically-agnostic aesthetic*. The uncertainty surrounding visual feedback proceeds from the classic definition of a medium (discussed previously)—a means of transmission, thereby insinuating a technology of transmission. Transmission favors the sender, the encoding, and the original information. Media theory, as I have said, focuses on the receiver, the decoding, and the received information, only it disguises it as transmission and transmitted information. In other words, media theory claims a desired form—the experienced signifier, the expression of a technology, the output—results from a transmitting material form; this combination defines a medium as both enabling raw information flow and expressive communication. Although the material portion certainly enables communication, it is the output that transforms the material affordances and limitations into expression. However dependent a medium appears to be on its material technology, it is fairly innocuous in most cases—television serves as metonymy for Television; film for Cinema. In circumstances where no techno-medial genealogy exists, an orphaned form emerges—the visual feedback loop seems to be sired by the ether, immaculately conceived, a circumstance of and within media.

The entwining of material and immaterial does not discount media theory all together. The ideas, typically addressed in regards to media, account in part for desired forms. The conclusion is that technology does not singularly determine expression. For example,

Nam June Paik's *Magnet TV* and Woody Valsulka's *C-Trend* both illustrate magnet manipulations of video. Paik's work uses magnets to physically and externally manipulate video, rendering it non-recordable.¹ Valsulka's work uses "electronic deflection modulation"² by way of the Rutt/Etra Scan Processor to internally and procedurally manipulate the raster image.³ For Valsulka, the manipulation relies on the digital signal of video technology; for Paik, the manipulation the material output device, a television. To consider both pieces works of video art, one must look to their aesthetic tradition and formal output rather their encoded input.

Avoiding a techno-medial teleology, this section explores remediation and spatial montage as theories for the desired form. While each of these ideas has been traced to a technology or the conditions of a technology, I will only consider the implications of the outward form.

Remediation

The term remediation, as explained by Jay Bolter and Richard Grusin, is "the representation of one medium in another."⁴ For example, the website for Museum of Modern Art (<http://www.moma.org/>) has an extensive digital catalog of the works on display in physical New York City museum. Paintings, photographs, sculptures, and installations are digitally recorded, entered into an online database, and shown in the

¹ Meigh-Andrews, 121.

² Meigh-Andrews, 121.

³ Meigh-Andrews, 126.

⁴ Bolter and Grusin, 44.

various sections of the website. "Ideally, there should be no difference between the experience of seeing a painting in person and on the computer screen, but this is never so."⁵ While there are obvious differences—such as resolution or coloration—the bigger differences germinate from how computer remediation recombines our expectations, uses, and conceptions of the original work.

Currently, an exhibition⁶ of Monet's *Water Lilies, 1914-26* is featured at the MoMA.

When viewing the exhibition in a gallery space, a certain protocol is followed—one must be quiet, not take photographs, and not touch the painting. In the digital exhibition space, the experience is very different. The artwork becomes indistinguishable from any other digital objects—it can be copied to the desktop, clicked on as an icon, or hovered over to reveal details. Alongside the digitized paintings are lengthy curatorial notes, as well as suggested texts, advertisements for upcoming events, and a navigation bar to access other parts of the virtual exhibition. Even more, how and where one experiences the paintings is enabled by flexible digital access—one can be listening to music, wearing pajamas, talking on the phone, or writing a paper. While the visual components of the painting (may) remain essentially unchanged, the experience of that painting changes drastically. The drastic change comes from how the digital medium remediates a painting.

Structuring remediation are two distinct and opposing goals: immediacy and hypermediacy. These goals form the end points of a singular axis. Immediacy denotes disappearance and transparency of a medium—"perceptual immediacy [is] experience

⁵ Bolter and Grusin, 44.

⁶ Sept. 2009-April 2010

without mediation [...] one that erases itself, so that the user is no longer aware of confronting a medium, but instead stands in an immediate relationship to the contents of that medium."⁷ Immediacy provides the audience with a window-like experience of the medium; the medium is seen through and forgotten. Hypermediacy speaks to the other end. "In the logic of hypermediacy, the artist (or multimedia programmer or web designer) strives to make the viewer acknowledge the medium as a medium and to delight in that acknowledgment."⁸ Hypermediacy breaks the illusion of the immediacy. Hypermediacy and immediacy are always at work in a medium, pulling the attention of the audience back and forth. *Water Lilies* demonstrate this double logic quite nicely. As much as the paintings represent a depiction ("Those are water lilies!"), they also present a painting style ("Representational form comes from the juxtaposed colors!"). Likewise, the online image aims to represent the paintings as well as present the mode of representation (demonstrated by mouse-over effects). For digital remediation, hypermediacy and immediacy work in layers. To look at the *Water Lilies* and see the *Water Lilies* themselves is a double transparency (both painting and computer disappear). To see the painting as a painting is to expose the painting's illusion, but still succumb computer's.⁹

Underneath remediation is the distinct concept that information is non-unique, and so constantly suffering from re-transmission. For example, the MoMA website remediates Monet's *Water Lilies* in that the online counterpart corresponds to some original amount

⁷ Bolter and Grusin, 22-24.

⁸ Bolter and Grusin, 41-42.

⁹ Arguably, awareness of the computer's illusion is only a single layer, stopping one's awareness before any subsequent layering.

of information from the actual paintings. Remediation asserts that "what is new about digital media lies in their particular strategies for remediating [...] Repurposing as remediation is both what is 'unique to digital worlds' and what denies the possibility of that uniqueness."¹⁰ Counter to this argument is Steven Holtzman, who claims that for digital media to become an "authentic aesthetic [...] *[w]e need to transcend the old [repurposed metaphors] to discover completely new worlds of expression.*"¹¹ Bolter and Grusin refute this claim as "comfortable, modernist rhetoric, in which digital media cannot be significant until they make a radical break with the past."¹² In both views persists the stance that it is information transmission that defines the digital medium.

To extend the argument at the beginning of this chapter, remediation marks a process of re-reception and re-decoding as opposed to re-transmission and re-encoding. In the latter, remediation depends on sender and technology; in the former, remediation depends on decoder and outward form. The original definition alludes to this new stance, while ascribing to the old one. When Bolter and Grusin claim digital media absorb other technologies, they in fact mean digital media *recreate* the functions of other technologies. The recreation of functions relies on the *exterior perception* of the *interior process*. In other words, remediation depends on perceived affordances, and so a fundamental simulation through surface emulation. Remediation, in a distinctly postmodern manner, borrows these outward metaphors to dispose the audience to thinking in the terms of another desired form. The webcam remediates television by recreating television's

¹⁰ Bolter and Grusin, 50.

¹¹ Bolter and Grusin, 49; original emphasis

¹² Bolter and Grusin, 49-50.

"monitoring function,"¹³ that is, television's "capacity to record and display images simultaneously with our viewing offers a quality of presentness, of 'here and now' as distinct from the cinema's 'there and then.'"¹⁴ Webcams exteriorize what defines television in its use of television signs—channels, broadcasts, etc. The remoteness of many webcams makes this unverifiable; it does not discount the audience's perception of temporal presentness.

Visual feedback embodies many of these amended concepts from remediation. First, visual feedback relies on immediacy and hypermediacy. When the spectator-user becomes aware of self-observation, the output screen in *Live Taped Video Corridor* switches from opaque—"I see a television monitor"—to transparent—"I see myself." The double logic does not, however, divide along the two arcs of feedback in a respective fashion. Each arc substantiates the double logic differently and at different times. An awareness of the physical body with respect to the visual self in *Lived Taped Video Corridor* proceeds in the opposite fashion. Walking into the corridor, save the spatial constraints, does not reinforce an awareness of a living-body being-in-the-world; the physical self is transparent. The appearance of the virtual self forces one outside of the physical self into the augmented and virtual selves. In other words, as the forward arc initially moves from opaque to transparent, the reverse arc move in the opposite direction.

¹³ Bolter and Grusin, 204.; emphasis mine

¹⁴ Bolter and Grusin, 187-188.

Another example can be found in GPS navigation. When the virtual self approaches a turn, the driving path bends and the unit gives auditory commands. When a person turns smoothly, the prompts cease; the virtual and physical self align in contiguous space on the map and in the world. What one does, sees, and sees being done are all the same. When the person cannot turn—like the example from before—the navigation unit becomes obvious as unworldly. The prescribed route extends in virtual space where one cannot go in physical space; the commands to turn are no longer relevant, and move from the realm of subliminal reminder to super-liminal nuisance. Fluidity is disrupted as the unit recalculates the course. The disconnect exposes the navigation unit as not having perceptual omniscience.¹⁵ The subliminal commands no longer controls the physical body. Unlike the artistic use of hypermediacy, the visual feedback loop breaks down (really a breakdown of usefulness) when the navigation unit incorrectly directs the user.

Like all remediations, visual feedback constantly acts in a dialogue with other desired forms. For instance, the audience accepts the I/eye condition of the "viewing-view/viewed-view" in film. In visual feedback, the same acceptance—technological augmentation—occurs. Through one's knowledge of cinematic spectatorship, spectator-user embodies this hermeneutic zeroness when entering the loop's field. Moreover, the replication of televisual presentness in the various incarnations of visual feedback generates the co-temporal relationship between the virtual and the physical self, thereby splitting the homogeneous loop into two arcs.

¹⁵ There are navigation units that do adjust in these up-to-date circumstances.

As a simulation of functions, remediation accounts for the persistence of visual feedback loops as a desired forms; that is to say, visual feedback is pure remediation. When a desired form emerges from a technology, remediation states that other media (technologies and desired forms) will try to reproduce the functions of that form. In the case of visual feedback, remediation does not divorce the desired form from an initial technology; visual feedback as a form manifests within technology without resulting from a technology. Even in its first technological incarnation (video, mirror, or water's surface for Narcissus), the visual feedback loop has been remediated—the functions and components of the experience do not come from the particular expressive medium in which they seems to arise.

Remediation can be formulated in several ways; Bolter and Grusin outline three main restatements of remediation:¹⁶

- + remediation as the mediation of mediation
- + remediation as the inseparability of mediation and reality
- + remediation as reform

The first of these is captured in the re-presentation of Monet's *Water Lilies* in a digital form. The mediation of Monet's reality is again mediated to the audience through a computer screen; the audience views a digital image of a painting, which through its double logic, moves back and forth between direct and indirect modes of perception. Similarly, the visual feedback loop remediates embodied sight through an augmented perspective. The input device adds another mechanism between visible reality; the output device transforms visibility into visibility.

¹⁶ Bolter and Grusin, 55-62.

The last restatement can also be found in the digital presentation of *Water Lilies*. The audience encounters links, expanded explanations, and a dynamic viewing space; the website rehabilitates the notion of a gallery as an information space.¹⁷ The visual feedback loop, likewise, reforms the notion of embodied perception, offering an extension that exposes additional (if not the original) fallacies of observation.

Additionally, videogames, such as *Portal* (Valve, 2007), reform how visual feedback function in situations of navigation. To move from one location to another most quickly in *Portal*, one distorts space, repositioning locations as adjacent by way of a portal device. The notion of relational space, viz. Leibnizian space, combines with Euclidean notions of space—perceivable space constitutes both a relation amongst object and relation amongst *spaces-as-objects*.

Remediation of the loop and indistinguishable reality

The second of the formulations of remediation—remediation as the inseparability of mediation and reality—requires an expanded perspective with regards to visual feedback. Essentially, the visual feedback loop remediates the notion of the programmatic loop in physical space. Lev Manovich provides the background support.

Generally, the loop is a cyclic process of repeatedly moving through the same data; the visual loop repeats a sequence of images, thereby engendering an aesthetic of the procedural structure. Lev Manovich cites Thomas Edison's Kinetoscope as a genesis for

¹⁷ Bolter and Grusin, 56.

visual loops; these films were short, looped sequences designed for private viewing.¹⁸

The visual loop as a form arose, at least in part, out of necessity due to storage limitations.¹⁹ The limited storage, while pigeonholing the potential expressive capabilities of early film technologies, opens up the procedurality of visual production. A loop purifies action by stripping it from its actual duration. As a result, action becomes compartmental and iterative—action shifts from function to object. When action exists as an object, it is subject to manipulation, reproduction, exchange, and uniformity.

For example, hand-drawn animation frequently exploits loops to reduce the number of unique cells needed to portray an action like running.²⁰ Animators design, instead, a series of action sprites. A stride may be composed of three cells; running is just the repetition of those cells. A chase can be described as cycles of action—background cycles and character cycles. Manovich continues:

"Programming involves altering the linear flow of data through control structures, such as 'if/then' and 'repeat/while'; the loop is the most elementary of these control structures. Most computer programs are based on repetitions of a set of number steps; this repetition is controlled by the program's main loop. So if we strip the computer from its usual interface and follow the execution of a typical computer program, the computer will reveal itself to be [composed of loops] [...] As the practice of computer programming illustrates, the loop and the sequential progression do not have to be considered mutually exclusive. A computer program progresses from start to finish by executing a series of loops."²¹

¹⁸ Manovich, *The Language of New Media*, 313.

¹⁹ Manovich, *The Language of New Media*, 316.

²⁰ Manovich, *The Language of New Media*, 318.

²¹ Manovich, *The Language of New Media*, 317.

The power of the loop, as Manovich states, is that it expresses duration in a closed-form; the program as a closed-form collects a series of closed-forms, i.e. loops, to accomplish some goal. Action, interaction, and duration of a program come from a compact representation.

In this final thought, the visual feedback loop remediates living-space and living-bodies in a closed-form. This does not imply that the visual loop and the visual feedback loop function similarly. For instance, the time of the visual loop, though internally cyclic, is externally linear—a looped stride animation portrays a lengthy chase. Furthermore, the visual loop relies on external spectatorship for comprehension. Visual feedback shares the ability of the loop to express temporal and spatial experience succinctly, that is, in a closed-form.

The closed-form of the visual feedback loop blends (maybe obviously) the physical and virtual spaces. Bolter and Grusin explain that remediation as the inseparability of reality and mediation can be seen in the photographic line-of-sight; people act "as if it were a real obstruction [...] [Thus, people] acknowledge the reality of the act of mediation".²²

When entering into the visual feedback loop, the conceptual understanding and cultural practice of procedurality are at work. The visual field seen as a virtual world has physical influence. As the forward arc enables the procession of the virtual self, the reverse arc realizes the procession. Being seen through the input device and exposed in the output device changes the spectator-user into a self performer. The visible body is made into a spectacle of control. Panopticism is typically describes how sight controls others;

²² Bolter and Grusin, 59.

similarly, self-sight garners a Lacanian reunion of controlling the actions of another who is in fact the self. The Self-Other duality collapses—a simulation of power comes from the controlled Other being signified by the controlling Self as controlling the Self.

The doubling of the body transforms bodily actions into objects. Each action is duplicated, distributed, and re-signified. Reality and virtuality morph reflectively. The visual loop as an aesthetic can be explored internally. The effortlessness of computer manipulation of action-objects (seen from the outside) is imbued with effortful-ness. The double-signified self must always perform and re-perform; no action can be singularly enacted. The looped body labors in this closed-form; it performs each iteration.

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The task of reconciling the visual feedback loop with media theory is by no means complete. In its incomplete state, there are innumerable avenues for further exploration. The three largest issues require an appended definition. The first of issue is that of time. As previously mentioned, the current definition does not account for a particular understanding of how time unravels (other than the fact it does).

The second issue comes from the exclusion of sound. In Rozin's mirrors, as much as *Live Taped Video Corridor*, there is a sound component to the dual arcs. As one moves before a physical mirror, the pixels click in their movement; in its external state, the mirror beckons similarly. The claustrophobia of *Live Taped Video Corridor* is emphasized by a distortion of sounds. Minute sounds outside the corridor become amplified and directed

inside. In other feedback loops, such as GPS navigation, sound contributes to how one registers its usefulness.

The last issue is that of intersubjectivity. While I have posited that one exists in an intersubjective relationship with the virtual self, the definition does not account for instances where groups enter the loop or when loops combine. The latter of these can be found in video chat. As two people converse, each experiences a personal feedback loop. These loops, however, entwine. What does this imply about the loop as a desired form? Can the components of the loop be reconciled when additional people enter?

These queries will need to be addressed at a later time.

EPILOGUE:

MEDIA OF SIMULATIONS

"The copy is an image endowed with resemblance,
the simulacrum is an image without resemblance."
—Gilles Deleuze¹

Mediation/remediation of the visual feedback loop means a reification of its characteristics. Therefore, each instance remediates the *relationships* amongst these components, varying the weight of each component based on the (perceivable) affordances of the technology. This leads to a larger question:

Is a material instance of a desired form a copy or a simulacrum?

For the sake of the argument, we will first assume each instance of visual feedback loop is a copy. This means that any one visual feedback loop resembles any other visual feedback loop; the components are the same, albeit the weights of those components are different. Then, as a copy, a visual feedback loop is always inexact. One instance resembles another as much as one is willing to smooth out differences in the material forms. Eventually, if we consider copying a form of induction, we arrive at some Platonic notion of visual feedback—the perfect visual feedback loop. From this mold, all other loops are modeled, each being incomplete and imperfect (hence, differently weighted). If we assume that each instance is a copy, we also assume that there exists, and has existed, some *a priori* notion of visual feedback.

¹ Gilles Deleuze and Rosalind Krauss. "Plato and the Simulacrum." (*October* 27, no. Winter (1983): 45-56.), 48.

On the other end, if we assume the visual feedback loop is a simulacrum—a sign that lacks signification—then, all remediations of the visual feedback loops are simulations—artificial circumstances created by mediation. Two instances differ insofar as the two instances are different simulations. The characteristics of the loop offer a formula, in which different values can be entered; different simulations result from different initial values. The collection of all visual feedback loops (if one could be made) would present a wide range of examples, all of which share a similar notion.

In both cases, induction becomes deduction. The same can be said to apply to desired forms more generally. A desired form exists between the boundary of copy and simulacrum; it can neither resemble nor not resemble. The desired form exceeds the all constraints of obsolescence.

What does this mean for media more generally though? Simply, as media theory transitions toward a post-medium age, the copy and the simulacrum become inconsequential; the desired form is all that is left.

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Note: All images not listed below are the creation of Thomas James Lodato (2010)

"Nam June Paik, Tv Buddha." ZKM Center for Art and Media, <http://www.medienkunstnetz.de/works/live-taped-video-corridor/>.

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