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Fusing Bodies: A Consideration of Techno-Spliced Gestures in Interactive Installations

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ABSTRACT

How might our logic be changing as ubiquitous computing links our gestural acts to those of distant, yet virtually present bodies? Neurological researchers along with theorists of embodiment will be drawn into a consideration of the negotiation of moving bodies through sensor-mined environments, exploring the impact such negotiations have on the generation of meaning. The body will be considered as a complex system of transducers, actuated by diverse powers in collaborative environments. Interactive sound installations created by the author will be analyzed as triggers to a consideration of techno-spliced gestures in mixed reality.

Categories and Subject Descriptors

J.5 [Computer Applications]: Arts and Humanities – *Arts, fine and performing.*

General Terms

Documentation, Performance, Design, Experimentation, Human Factors, Theory.

Keywords

Interactive, sound, installation, gesture, dance, CECUT, Between Bodies, Training, Displacement, Around, Tijuana, Proyecto Cívico, UCSD, sensors, infrared, proximity, video, walking, ubiquitous computing, physical computing, embodiment, technology, art, transduction, transducer, sculpture, environment.

1. INTRODUCTION

As a media artist and former dancer, I have been attracted to and working with various “gesture-sensors”, to create interactive sound installations, video installations and performances. The data captured by such sensors can be easily info-morphed – the gestural information can be used to alter sound, video, or any other data stream. Thus the sensors allow the rhythms and characteristics of bodily gestures to be experienced through other senses. Underlying this work is an interest in the cross-modal production of thought – how the shuttling of a perception across branches of the sensory system (the proprioceptive and the auditory, for example) might affect logics built upon this cerebral info-morphing. In this light, might performing a new gesture generate new flavors of thought in the mind? How might our logic



Figure 1. *Between Bodies*, CECUT entrance, Tijuana, Mexico

change as ubiquitous computing links our gestural acts to those of distant, yet virtually present bodies?

I am thinking of gesture here in its broadest sense, running from unconscious postures and movements on through deliberately expressive bodily movement [1]. My perspective is that these postures and movements are controlled by neural patterns

generated by feedback loops, running between physical, psychological and technological logics.

The notion of the “interactive” will also be explored here as a layered complex of exchanges, including but not limited to scripted and open-ended interactions facilitated by computer driven devices. Interactions, i.e. “reciprocal actions” [2] – between bodies physically present in an installation, between bodies present and absent in an installation, and between bodies and techno-logics – will all be considered as elements contributing to a multi-faceted interactivity.

2. BETWEEN BODIES

See video at :

<http://www.ninawaisman.net/cecut/cecutEmbed.html>

2.1 Overview

Between Bodies is an interactive sound installation that links the visitors’ gestures to a wide range of bodily and sonic energies circulating throughout Tijuana, making visceral the connections visitors have to the diverse networks of human agency at work in the city. Products assembled at great human cost in Tijuana are sold worldwide, yet ongoing media hype would suggest our only connection to the people of this city is through fear. We ingest media’s relentless feed of images and texts sensationalizing drug-related crimes; terrified, most stay away from the city, effecting a growing economic blockade. This damaging cycle of media-fueled isolation is not unique to Tijuana.

In contrast, *Between Bodies* samples everyday work and play sound-gestures, recorded throughout Tijuana, focusing on the 99% of local life that is not being portrayed in the mass media. While the piece is not overtly political in regard to the issues sketched above, there is a micro-politics at play in the piece that I hope to unpack here, and connect to neurological and cultural research on the role of gesture in thought formation.

2.2 Design and Content [3]

Sensors triggered in the funnel-like entrance to *Between Bodies* produce rhythmic sounds of constructive labor –typing, sweeping, hammering, etc., recorded throughout Tijuana. While the particular sources of the sounds are not declared in the space, it is hoped that the diverse energies of bodily productivity may be felt [4]. If multiple visitors pass through this entry curtain at the same time, they create networked re-compositions of the city’s sonic rhythms.

The next sensor-arrangement encountered encourages visitors to move off to the side of the space, diverging from the building’s architecturally implied choreography. One person can “play” the tight circular enclosure at the end of this curve, or multiple people can engage with it at once. This section is filled with sounds of people trying to get your attention in Tijuana – vendors using bike horns, voice, music, bullhorn announcements, the sound of someone playing a replica of an ancient Aztec flute, etc.

The following S-shaped sensor-drawing also permits solo or multiple visitors to create sound compositions. The sound here consists primarily of children playing and working in the streets of Tijuana – jump-roping, buying ice cream, working in a market, digging ditches, and so on. The last drawing, a simple C-curve, is placed so that it will, like the entry-funnel, capture most anyone



Figure 2. *Between Bodies*, looking down the entry hall of the international wing of the CECUT museum, Tijuana

passing by. This section is focused on sounds of policing and control, undercut by sounds that complicate those power narratives.

In all sections, sounds are triggered and changed by visitors’ movements. Pitch, speed, volume, spatialization and layering of the sonic components are variously changed in real time in relation to a visitor’s gestures and proximity to sensors. Sensors are placed at different heights in relation to the visitor’s body, addressing various latitudes between the thighs and the neck. The idea was to heighten the visitors’ bodily relation to technology, rather than privilege the head/mind that might be looking at and listening to the piece.

A mixed reality is offered, in which technology virtually expands the visceral sensation of one’s connectedness to residents of Tijuana. Moving towards the sensors, gesturing, trying out just slight-out-of-the-ordinary moves, allow a visitor to experience and modulate sound generated by other bodies in Tijuana, to use technology’s potential to, as Mark Hansen has written, “[overcome] the atomic isolation of the body...[giving] us a chance to live the ‘indivision’ of the body”. [5] Thus the encounter for visitors is one in which their bodily gestures meet those of Tijuana residents, linking the gestural, lived time of a body in the museum to that of bodies outside.

2.3 Experiential Effects

2.3.1 Transduction

If we are living in an attention economy, the sensors in *Between Bodies* trigger quasi-advertisements for the energy of Tijuana. But these adverts ask you to move with them, to supply your bodily energy to the system. The visitor’s body can become, in this piece, a tuning instrument for other recorded bodies, a transducer of other bodies’ energies. Here’s one dictionary definition for transducer:

“transducer, n. a device that is actuated by power from one system and supplies power usually in another form to a second system.” [6]

I’m thinking of the body as a vast system of transducers, actuated by powers (physical, social, technological) in the environments it encounters [7]. In the installation, a body will inevitably come near one or more sensors in the hall. So the question becomes, what powers are being actuated by this visitor’s body, and what

new forms of power does that body then provide to the system? The most obvious force actuated by a body at each sensor is sonic. As the sound waves enter the body in response to its motions, the body responds by avoiding or courting these waves. The sonic waves might be transduced by a body into the force of curiosity, driving a visitor further into the piece, or repelling her, if she finds the sound unpleasant. The desire for control might be transduced from the comprehension that the physical waves penetrating the body can be manipulated. There might be an erotic or empathetic or exploitative power generated by the body's manipulation of the sound of another recorded body, or a machine.

As a visitor triggers sound, others in the room often turn to consider the sound source, i.e. the behavior of the person triggering the sound. The "transducer" in this case becomes a watched performer; this role functions as a stimulant for some and a discomfort for others. Sonic energy here is transduced by a body into social dynamics centered around exhibitionist energies and bodily confidence, while the interactor feeds additional sonic content into the space. This in turn actuates a range of responses and potential soundplay from others. The system is in many ways collaborative, as it is shaped and played by multiple mind-bodies. But transduction here, ideally, is not a one-way street. To explore the sound of another's body in an interesting way requires one to listen to its rhythms, its pitch, to become attuned to them, to internalize them in some way. A kind of gestural, or bodily understanding is hoped for.



Figure 3. *Between Bodies*, FILE New Media Festival, São Paulo, Brasil

Consider how when you dance with a stranger in a club, once in a while it really works – you find a rhythm or logic of movement with this unknown person that is like a sublime conversation, or even great sex. And there is the thrill and fear of doing this in public, of having others witness this exchange, and pick up on its energy. Alternatively, the dance might be agonizingly awkward, and that too becomes public. In any case you exchange something with this other dancer – an unspoken dialogue, an attempt at attunement to one's partner takes place. While *Between Bodies* does not lead visitors to dance in a traditional sense, its sensor/sound/gesture combination allows you to adjust your rhythms to those of a recorded body (or machine, in some cases), or to adjust its rhythms to yours. In this way, your gestures become the primary tool with which you explore, populate and shape a sonic re-mapping of the city. Your encounter with, and agency over other bodies in that city is technologically expanded

by a fine-grained linkage between two gestural spaces, linking in turn, should you care to consider them, two disparate worlds of enaction.

The hope was that such gestural-sonic exchanges would afford a synching-up of bodies, or that they might produce non-conscious bodily attunements. Recent research on mirror neurons by Vittorio Gallese and Alvin Goldman supports this notion. As an example, a monkey watches another monkey grabbing a nut. Neurons in the observer-monkey's brain fire as if the observer-monkey were grabbing this nut himself - a "mirror-neuron" firing takes place in the watching monkey's brain. [8] Monkey-see, monkey-do, then, happens simultaneously on the neurological level when the observed action is one of significance to the monkey. A 2002 paper by Evelyne Kohler, Vittorio Gallese, et al., presents studies in which neurons for nut-cracking will fire in the brains of monkeys who simply *hear* the sound of nut-cracking – they need not see another monkey performing the action. [9] Perhaps, then, the dialog between real and recorded bodies in *Between Bodies* is a concretely realized neuronal attunement. You hear someone typing; you become in your brain a virtual typist. You don't enact the gesture but the nerves that would produce that action fire. Here is embodied virtuality on the edge of becoming. Or perhaps already "become", in that the neural tape for typing is in fact played. Directing visitors' attention to the sounds of everyday life in Tijuana then, might create a concrete, sensorimotor "synergia" between visitor and laborer. [10]

Gallese and Goldman's pivotal work on mirror neurons speculates on the purpose of this system. "One possible function is to enable an organism to detect certain mental states of observed conspecifics. This function might be part of, or a precursor to, a more general mind-reading ability. According to [the] 'simulation theory' [of mind reading], *other people's mental states are represented by adopting their perspective: by tracking or matching their states with resonant states of one's own.* The activity of mirror neurons, and the fact that observers undergo motor facilitation in the same muscular groups as those utilized by target agents, are findings that accord well with simulation theory..." (my italics) [11]

The mirror neuron system fires in an attempt to gain knowledge about another body – knowledge acquired by neurally internalizing the other's bodily acts. We may be consumers of others, then, at a very fundamental level. This is no abstract situation – bodies are physically readied as "observers undergo motor facilitation in the same muscular groups as those utilized by target agents". A transduction of another's bodily rhythms takes place, potentially producing unconscious empathies and understandings.

This possibility of a simultaneously concrete gesture (the gestural neurons fire; the sensorimotor system readies a possible action) and virtual gesture (virtual, because the physical manifestation of the gesture is suppressed and unconscious to the owner of those neurons, and unseen by observers) suggests that the embodied virtuality of "mixed reality" has been taking place in the brain long before we had the hybrid spaces afforded by story-telling, books, or ubiquitous computing. Higher-level virtual-concrete layering has gone on since humans have been able to consciously imagine one experience or space while concretely existing in a different one. But mirror neurons suggest this has also been happening at a much deeper level, in ways that unconsciously

train our bodies along the paths of seen and/or heard *motor* phenomenon enacted in our concrete world.

2.3.2 Site-less and Sited Sound

Many of the sounds triggered in the entrance of *Between Bodies* are seemingly iconic – hammering, raking, filing. On the other hand, abstracted sound can be hard to pinpoint in the mind; the quality of a particular sound may evoke a range of activities. I’m interested in this blurred state of recognition, in which the body perceives a stimulus, triggering multiple responses (and perhaps multiple neural mirrorings), while the mind attempts to fix an understanding – to locate the sound, to label it – but can’t exactly. There is an anomic quality to this kind of perception, that defies the desire to categorize – an amorphic connectedness that precedes the individuation implicit in naming.

I wanted these seemingly site-less sounds to open the piece, to create a common-denominator of bodily and sonic experiences that would have been heard throughout Tijuana but also most anywhere in the world, sounds of bodily-gestures, gestures possibly engaged in by many visitors. The idea was to create a bodily dialog between visitors and the residents of Tijuana, a dialog not dependent on knowledge of the city, thus one that might open the city and its common experiences to visitors who had not ventured beyond the taxi-ride between the border and the museum.



Figure 4. *Between Bodies*, CECUT, and one sound source in Tijuana

But there are subtle localizing effects in the first sonic section that Tijuana residents notice. Additional field recordings of local sound are triggered at some sensors – traffic in Tijuana; local birds, voices on the street, etc. Such geographically tagged undercurrents of sound increase in number as one advances through the piece. Passing the outside of the second section triggers the most iconic of Tijuana sounds – that of the clanging gates which all pedestrians must walk through on entering the city. With this clanging, a gesture made in the museum is connected directly to gestures undergone at the precise site of the pedestrian crossing.

Many residents described to me an immediate recognition of their city – for them, the piece became an experience of moving inside the museum while connecting to sonic bodies encountered throughout their city, and to a personal history with many of those bodies. To move through the piece, for them, was to gain agency over their sonic experience of the city – they could choose if and when they heard a sound, the speed or pitch at which they heard it, and its conjunction with other sounds of their own choosing (from the available curation of urban sounds). The (natural) role of the sensing body as Theremin, tuning a city, is here

technologically enhanced. Gestural engagements with the sensors expand a body’s ability to construct a concretely lived and felt re-mapping of the city.



Figure 5. *Between Bodies*, CECUT, and one sound source in Tijuana

For non-residents visiting the piece, many sounds did not have this same geographically/temporally tagged resonance. But most tourists identified the music as local, along with the sounds of the border gates and taxi calls. Many surmised from these cues that all the sounds were local and thus understood their experience to be one of interacting with the city and its people, in ways more attached to the commonality of the sounds rather than based on personal experience in the city. [12] There is a risk that the piece offers tourists a virtual experience of the city in place of a concrete encounter. But I hope the mirror-neuron effect might concretely expose such bodies to some of the lives they are avoiding.

2.4 Disturbing Seamless Technologies

The somewhat obstructionist placement of sensors in *Between Bodies* encourages a choreography that runs against the “seamless” narrative established by the architecture. In the original installation at the CECUT museum in Tijuana, the building’s 20-meter long, funnel-like entrance architecture was low lit; the ceiling rose as one followed the descending entrance to finally reach the daylight-filled main lobby. The impression was one of descending into an imposing tomb whose lit, lower chambers could only be reached *after* one had been properly purged through time, darkness, and silence, of the effects of the city. *Between Bodies* sought to bring this architecturally choreographed logic front and center by offering some of what it concealed – the guts of the infrastructure connecting it to the city (dangling wire), the chaotic, sonic pleasures of Tijuana, a potential *dérive*, available to those who veered off the straight-line conduit implied by the funnel.

The problematics of seamless technology, then, do not apply solely to ubi-comp. Before producing his famous texts on “calm technology” in 1995/6, Mark Weiser wrote in 1991 “The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.” [13] But to disappear something is not to disappear the ideological impacts built into it; its effects will act deeply, undercover, a bit like the skeletons in one’s closet.

Between Bodies brings the sensors, another typically “calm” technology, front and center – where normally they might be disappeared into the corners of a room or lurk peripherally over a doorway or atop a fence. The Tijuana/San Diego border is watched by battalions of sensors – infrared night vision systems,

unmanned aerial vehicles (UAVs), video cameras, motion detectors, etc., along with thousands of human eyes. *Between Bodies* uses mostly infrared proximity sensors, which look like tiny eyeballs or binoculars. Whether one is familiar with these particular sensors or not, the presence of many small eyes in the room will likely strike a chord, bringing what is usually peripheral into the center, where its impact might be consciously re-considered.

But sensors, like architecture, even when staged as “seamless”, will impact the body on many levels. We move subtly towards or away from cameras, depending on our desire to be seen or perform; regardless, we become performers in a script that at some level reinforces our relationship to an unseen network of watchers. When we approach an automatic sink we offer our hands in a reach for both power and supplication. If the water streams out we feel empowered, the course of cleansing quickens, we and efficiency win. If we miss the sweet spot we become aware of the virtual filter for right and wrong behaviors; we become frustrated, time sputters. Our need to perform concretely as points in a virtual data-grid – is underscored as the hybrid reality imposes gestural and psychological adjustments.

By bringing technology to the fore visually (highlighting the sensors) and gesturally (foregrounding the technology of a body interacting with a sensor), the implications of a gestural dialog between bodies on both sides of sensors, through technology, might be felt. The potential meanings of this layering of gestures in *Between Bodies* are posed as experiential questions for the visitor to explore.

3. GESTURAL ABSTRACTIONS AND THEIR IMPACT ON THOUGHT

V.S. Ramachandran, the Director of the Center for Brain and Cognition at UCSD, has proposed that human brain structure – the fact that the angular gyrus sits at “the crossroads between the parietal lobe (concerned with touch and proprioception), the temporal lobe (concerned with hearing) and the occipital lobe (concerned with vision)” – permits a “convergence of different sense modalities to create abstract, modality-free representations of things around us.” [14] Ramachandran theorizes that the cross-activation of these three regions of the brain is the likely springboard for abstraction of many kinds, including language. [15] Gesture, sourced in the critically located parietal lobe, is thus potentially a key contributor to the formation of all logics and abstractions that emerge from this synesthetic crossroads. A new techno-gesture then, is not a small thing.

Brian Massumi, similarly seizing on the synesthetic foundations of thought in *Parables for the Virtual*, summarizes a very different but related body of research in developmental psychology:

“Synesthesia is considered the norm for infantile perception. The theory is that it becomes so habitual as to fall out of perception in the “normal” course of growing up. It is thought to persist as a nonconscious underpinning of all subsequent perception, as if the objects and scenes we see are all “threads” pulled by habit from a biogrammatic fabric of existence...” [16]

Thus gesture co-forms the trans-sensory perceptions and memories that make up our thought; gesture can be abstracted and synesthetically info-morphed in the brain by other senses and by

all manner of “higher” thought processes built upon these exchanges. Merlin Donald, the cognitive neuroscientist, noted in his essay *Mimesis and the Executive Suite* that “Gestural skill is domain-general inasmuch as it can harness any input or output modality” [17]. What happens when learned gestures migrate across different output systems? Consider the scene in *Modern Times* in which Charlie Chaplin, the proto-hacker, overlays his assembly-line reflexes as a nut-tightener onto his equally reflexive response patterns to women. The result: Chaplin chasing women, waving his wrenches lasciviously, gleefully programmed to tighten the nut-like buttons fashionably positioned over the poor women’s buttocks and breasts. [18]



Figure 6. *Between Bodies*, FILE New Media Festival in São Paulo, Brasil

What might the neural mechanisms be behind such behavior? Rodolfo Llinas has suggested that our various innovations might simply be byproducts of interference amongst learned motor patterns endlessly replaying in the brain:

“...activity in the basal ganglia is running all the time, playing motor patterns and snippets of motor patterns amongst and between themselves - and because of the odd, re-entrant inhibitory connectivity amongst and between these nuclei, they seem to act as a continuous, random, motor pattern noise generator. Here and there, a pattern or portion of a pattern escapes, without its apparent emotional counterpart, into the context of the thalamocortical system... And suddenly, you hear a song in your head... Things sometimes just come to us” [19]

This scenario of learned motor patterns playing continuously in the brain and influencing behavior connects to issues brought up in an earlier body of work I will briefly present, within a consideration of how gestural logics cross-pollinate, leak up, and modulate our daily behavior and culture.



Figure 7. *Modern Times*, Charlie Chaplin, 1936

4. TRAINING AND DISPLACEMENT

What kinds of control and/or creativity are afforded when something as essential as a walking rhythm is reprogrammed? Training presents one body's transduction of another body's sound in order to consider the widespread, deeper internalization of both control and understanding made possible when technology and culture join to train bodies.

Our paces are set by virtual rhythms and tracking systems to which we happily subscribe. We walk the city paced by individual soundtracks shuffled from commercially produced material, making our lives more hip, more metered, more efficient. What new forms of bodily targeting and splicing will be generated as our environments gain intelligence? Your footsteps might be swapped out for a gait and pace meant to adjust your mood or style. Your body will subtly give way as you puppet the moves deemed more desirable. On the other hand, there is a possibility for a new kind of attunement here. What might we understand of someone through a more direct alignment/attunement with this person's physical state?

Consider the video Training 2:

<http://www.ninawaisman.net/walks0107/training2Embed.html>

A woman is walking in a nearly empty space. She is barefoot, but generates the footfall of someone wearing hard-soled shoes, the sound echoing loudly off of the concrete floor. This continues for a few moments. The effect is, for some, briefly but viscerally disconcerting. But soon enough, the viewer realizes this is just an effect. Though the walker's steps appear aligned with the sonic footfalls, recurring mistakes in the alignment of her step and the sound make it clear she is walking to someone else's gait. The single sonic pace binds two spaces and times, creating concrete tension in this mixed reality.

As the performer in this particular video, I become the transducer for the sound of another body – a Hollywood trope, the typical male authoritative walker from a 40's film. I am re-mapped by his sonic footsteps in an odd way. My mind and body want to speed along, but both are slowed by his pace. I feel this man, with longer legs than mine, who takes more time than I would to move from A to B. One leg is shorter than the other, one receives more weight than the other. I spend my time moving between my own thoughts



Figure 8. *Training*, Marcuse Gallery, UCSD

and imaginations of and identification with the body and mind of the unseen walker. I am that already-doubled man in some way – both his performed filmic character and his asymmetrical physical underpinnings. The sonic footstep facilitates a motor-coupling between my body and his hybrid persona, one that expands in turn my virtual and concrete embodiments. Even when I don't think of the walker, my motor timing is altered and this alters my mental state, as it is given its form in part by the sonic and choreographic pace-making built into my concrete present. (The piece is best understood by seeing it along with other videos in the Training series, which are always shown as a group:

<http://www.ninawaisman.net/walks0107/index.html>)

The videos were an analog experiment, connecting phases of an interactive path, called *Displacement*. *Displacement 1.0* (Video at <http://www.ninawaisman.net/recent/displacementEarly1.html>) creates a shifting displacement of visitors' footsteps in time. As a visitor walks along this path, her footsteps are amplified and played back – first in exact alignment with her step, and then suddenly with an awkward delay in the playback. The effect of this sudden displacement of bodily sound, if you are the walker, is not unlike tripping. When the expected alignment of the body's sonic envelope gives way due to technological interference, a visceral unknowing of one's own body takes place – one trips concretely on one's delayed, virtual past. Another iteration of the path makes this sound-delay happen more gradually in space and time – in this version, the time of the body seems to variously thicken and thin, with the past stretching slowly away from the present, only to snap suddenly back before the present has occurred. [Video is called "basic path" in the link just above.]

There were intermediate iterations of the path [20] that I will skip, to quickly discuss *Displacement 2.0* (Video at <http://www.ninawaisman.net/between/Disp2Embed.html>) in which I pursued the experiments of the *Training* videos. With *Displacement 2.0*, I used technology to replace each of a visitor's sonic footsteps with a gradual "morphing" between two distinct sounds – high heels at one end of a path, and marching boots at the other end. The interest was to mis-align the proprioceptive body envelope with the sound of other bodies, bodies perhaps already pre-coded into our bodies through media and cultural programs lying below the surface. The coupling of lived and virtual sonic-gestural spaces through the medium of a walker's footstep created a disconcerting sense of doubled or rejiggered embodiment for some walkers, linking them viscerally to

characters already known to their bodies. Many visitors described the sensation of adjusting their bodies/gait to the sounds they became capable of emitting. Others became engaged in solo or collaborative experiments, generating sonic-gestural performances with the culturally encoded material.

Marcel Mauss in his 1934 essay *Techniques of the Body* [21] made a strong case, through globally wide-ranging anecdotes, that all physical behaviour is culturally inflected. Stance, gestures, posture are sculpted, at least in part, through social imprinting that teaches some behaviours only to prevent others. Hillel Schwartz's Foucaultian essay *Torque: The New Kinaesthetic of the Twentieth Century* surveys the mid-19th through mid-20th western belief that centred, unified, mind-body rhythms acted as the determinants and perfectors of efficient action. That era's analysis and attempted modulations of these rhythms, in the service of increasing mental and physical efficiency, re-formed the fields and forms of dance, industrial design, education, etc. [22] Jonathan Crary in his 1999 book *Suspensions of Perception* looks at the late 19th and 20th century obsession with attention "to demonstrate that vision is only one layer of a body that could be captured, shaped, or controlled by a range of external techniques. [23] In brief, gesture and sound have long been employed as mediums of social control; mediums through which a body can be made to transduce dominant ideas about efficiency, sexuality, morality, etc.

The *Training* and *Displacement* series do not pointedly deconstruct these kinds of power, but seek to draw a viewer's attention to a strange place of attention (the footstep) in order to consider what kinds of communication, control and escape might be found by technologically hybridizing the simple act of walking.

5. CONCLUSION

Much of the impact of ubiquitous computing on our sensorium is obscured in the push for seamless technology. By bringing ubi-comp and the mixed-reality negotiations it facilitates from the periphery to the center, I hope to create environments in which bodies might experientially and consciously query the virtual and concrete relationships our new techno-gestures afford.



Figure 9. *Displacement 2.0*, Museum at California Center for the Arts

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converts undervalued coins into pricier works of art by filing them into the forms of tourist mementos. Undercutting these rhythms are ambient neighborhood sounds, such as the sounds of roosters crowing in Maclovio Rojas, hundreds of roosters raised on disputed land, for cockfights, a sport/ritual of longstanding import in Mexico.

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- [10] Ribot's *The Psychology Emotions'* early definition of synesthesia, links it to synergia (agreement of motor tendencies) and sympathy: "If we try to follow the evolution of sympathy, we distinguish three principal phases. The first, or physiological, consists in an agreement of motor tendencies, a *synergia*; the second, or psychological, consists in an agreement of the emotional states, a *synaesthesia*; the third, or intellectual, results from a community of representations or ideas." See "synaesthesia." *Oxford English Dictionary*. Oxford University Press. Web. Oct. 12, 2009.
- [11] Gallese, Vittorio and Alvin Goldman.
- [12] The piece was recently exhibited (July-September 2009) at the FILE new media festival (<http://www.file.org.br/>) in São Paulo, Brazil, but I had little chance while there to talk with visitors to the piece. A very small query suggested that were a wide range of engagements with the sound. The piece was re-titled "Between Bodies/Tijuana", so those who read the wall sign understood where the sound came from. But since the huge majority had never been to this city, the sense of place was not overlaid with memories of Tijuana – rather I heard people comparing the sounds of Sao Paula to Tijuana and finding them similar, leading them to explore the piece with a sense that they intuitively understood life in Tijuana in some way. Others missed the "Tijuana" sign – one visitor told me that the sound generated a "general urban impression" for him that called up his memories of walking through the streets, alleys and fringes of Chicago, so he enjoyed moving through what he felt was a generic yet Chicago-inflected city, mapping it according to his interests in the various sounds.
- [13] Weiser, Mark. "The Computer for the 21st Century." Draft for Scientific American. Sept., 1991. Web. Oct. 12, 2009.
- [14] Ramachandran, V.S., *A Brief Tour of Human Consciousness*, New York City, Pearson Education Inc., p. 74, (2004)
- [15] Ramachandran, pp. 72-81
- [16] Massumi, 188
- [17] Donald, Merlin, "Mimesis and the Executive Suite: missing links in language evolution". In J. R. Hurford. M.Studdert-Kennedy, & C. Knight, eds. *Approaches to the Evolution of language: social and cognitive bases*. Cambridge University Press, 1998, p. 56.
- [18] See <http://www.youtube.com/watch?v=AvNQiF89Pek>
Scene described begins about 5:30 in; continue on through 2 encounters with women.
- [19] Llinas, Rodolfo R, *I of the Vortex: From Neurons to Self*, Cambridge, Mass, The MIT Press, p.170 (2002)
- [20] See <http://www.ninawaisman.net/recent/index.html>
- [21] Marcel Mauss, "Techniques of the Body" [1934], in *Incorporations*, ed. Jonathan Carey and Sanford Kwinter, New York, Zone Books, 454-77 (1992)
- [22] Schwartz, Hillel. "Torque: The New Kinaesthetic of the Twentieth Century", in *Incorporations*, eds. Jonathan Crary and Sanford Kwinter, New York, Zone Books, 71-126 (1992)
- [23] Jonathan Crary, *Suspensions of Perception: Attention, Spectacle and Modern Culture*, Cambridge, MA and London, The MIT Press, 3 (1999)