

Exploring Identity Through Design: A Focus on the Cultural Body Via Nami

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ABSTRACT

Identity is inextricably linked to culture and sustained through creation and performance of music and dance, yet discussion of agency and cultural tools informing design and performance application of gestural controllers is not widely discussed. The purpose of this paper is to discuss the cultural body, its consideration in existing gestural controller design, and how cultural design methods have the potential to extend musical/social identities and/or traditions within a technological context. In an effort to connect and reconnect with the author's personal Nikkei heritage, this paper will discuss the design of Nami – a custom built gestural controller and its applicability to extend the author's cultural body through a community-centric case study performance.

Author Keywords

Cultural diversity, hyperinstrument, gestural controller, design, performance

CCS Concepts

• **Social and professional topics** → **Cultural characteristics**; → • **Applied computing** → **Sound and music computing**; • **Hardware** → *Analysis and design of emerging devices and systems*;

1. INTRODUCTION

In Maurice Merleau-Ponty's research of phenomenology, the study of experience and consciousness, he asserts that the "mind is inseparable from our bodily, situated and physical nature" so the body-subject both thinks and perceives, and is ultimately our "access to the world" [1]. While the body-object is the physical material that constitutes our human body, the body-subject is the entity which experiences. We develop agency by perceiving the world from our self-identity and collective identity. While there are many definitions of agency, the most widely recognized one defines it as an "active entity constantly intervening in the course of events ongoing around [them]" [2].



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¹https://archive.org/details/pointing-at/Pointing-at_glove_Documentary.mp4

²<https://www.jstor.org/stable/3679709?seq=1>

³<https://sonami.net/>

⁴<https://research.gold.ac.uk/26000/7/Tanaka%20Music%20HCI.pdf>

Sociologist Anthony Giddens clarifies that agency is in the "entire embodied human being" and furthermore, is the "act against external constraints...[in order] to transform the structures and systems from which they derived" but more of than not "act routinely, in ways that reconstitute system and structure" [2]. This agency is reflected in our everyday movements. Our bodies internalize learned cultural etiquettes, movements and experiences through sense, sight, and feel affecting the way we relate to our instruments and tools.

2. THE CULTURAL BODY

The cultural body is a body-subject "marked by culture" and "'speaks' of and to cultural practice, the self, and history" through embodiment [3]. In a study conducted by Steven Wainwright and Bryan Turner, former dancers in the Royal Ballet in London revealed that their identity is inextricably rooted in their own body and once their formal dance career has ended, typically when they can no longer accomplish "physical tasks that once came 'naturally' to them" [4], it is exceedingly challenging to reinvent themselves outside the company.

Dancer and choreographer Anna Halprin's cultural body aimed to break the technical constraints of the modern dance culture by emphasizing the experience of personalized movement as the basis of choreography. By setting up improvisational structures for performances "improvisation became a way for expanding range of movement, rather than confining it to a codified vocabulary" [5]. In one instance, Halprin proposed students to "run while moving the spine through any possible positions" prioritizing the student's experience over the appearance [5].

If our bodies are innately tied to how we perceive our identity and the world, how can we design to connect with and extend the cultural body? While there is substantial documentation of ethnographic studies across artistic disciplines such as dance, theater, and music as well as cultural study within HCI design, ethnographic study of musical gestural controller design and socio-cultural considered design tools are largely limited and not widely available. I would be remiss not to acknowledge the considerable contributions to musical gestural controller design from Giuseppe Torre¹ ("Pointing-At Data Glove"), Michel Waisvisz² ("The Hands"), Laetitia Sonami³ ("The Lady's Glove"), Ataru Tanaka⁴ ("BioMuse"), Joseph Butch Rovani⁵ ("Collide"), Mari Kimura⁶ ("MUGIC"), Marco Donnarumma⁷ ("XS"), Imogen Heap⁸ ("Mi.Mu Gloves"), amongst many others.

In the following section, I will introduce and discuss the basic framework of the Cultural AI Design Tool™ (hereafter referred to as CAIDT and licensed under a Creative Commons Attribution-Noncommercial-ShareAlike-3.0 US license), a tool developed

⁵ http://www.soundidea.org/rovan/research_glove.html

⁶ <http://www.marikimura.com/mugic-sensor.html>

⁷ <http://res.marcodonnarumma.com/projects/xth-sense/>

⁸ <https://mimu.gloves.com/>

by Christine Meinders⁹ and inspired by the Feminist.AI Design Philosophy.

3. CULTURAL AI DESIGN TOOL (CAIDT)

The CAIDT is a “exploratory research and design tool” that utilizes socio-cultural context to inform the design of artificial intelligence and machine learning interfaces [7]. It was inspired by feminist research, community works, and the work of Rebecca Fiebrink, Alison Adam, Sara Ahmed, and N. Katherine Hayles. The Feminist.AI Design Philosophy is centered on designing collaboratively with and for unheard voices and communities considering their respective “sensory, cultural, and emotional conditions” and the inclusion of “embodiment in AI design” [6]. In the spirit of Dr. Fiebrink’s Wekinator¹⁰, and feminist practices – it is designed to complement other creative coding and industry AI tools (i.e. Wekinator, Runway ML, Magenta, P5.JS, ML5.JS, ML4A and other creative coding software) or function as a standalone tool. CAIDT is particularly inspired by Dr. Fiebrink’s machine learning framework, and feminist theory. The CAIDT helps the designer establish the socio-cultural rationale behind the following phases and components which are inextricably linked to the framework and the resulting system. Five phases of the tool include sketching, concept phase, critical thinking, reflections, and implementation (optional).

1. *Sketching* phase includes input (“data”), functionality (“model”), and material/form.
2. *Concept* phase includes training data, ML model (training engine), and data/form relationship.
3. *Critical Thinking* phase includes purpose, intentions, culture, and material/form exploration.
4. *Reflections* phase includes input, functionality, and final materials/form.

For this paper, these particular lenses have been modified to include only purpose, intention, and material exploration.

1. *Purpose*: Why are you doing this? Who is behind the input? Who is this for? What cultural and social assumptions and biases does the input support?
2. *Intent*: How are you doing this? Who created the rules/model? What do you want it to do? What is the output?
3. *Material*: What is the form? How do the answers to purpose and intent affect form?

While this tool is framed as an “AI Design Tool,” its building block components are still relevant in non-AI contexts. It is my hope to bring more awareness to these types of tools, and to encourage music technologists to consider these concepts and process in their designs. I will focus primarily on the sketching and critical thinking phases of CAIDT discussing the influence of the cultural body on the design of two case study gestural controllers and my glove interface Nami.

4. NAMI

Nami is my custom built MIDI glove interface designed for live electro-acoustic musical performance, improvisation, and a tool to extend my own multicultural background – primarily drawing from and contributing to the augmented trumpet, Nikkei, African American music, performer-composer, and gestural repertoires. In this most recent iteration, Nami utilizes a force-sensitive-resistor (FSR), flex sensors, buttons, hall effect sensors, and a photoresistor. While this paper details my personal cultural body through Nami, Nami is a flexible instrument allowing the user to use their own gestural

vocabulary to extend their cultural body. While some musical interfaces, DAWs, and musical notation software are culture specific in which the purpose, intent, and material reflect and privilege a particular cultural framework (i.e. Sibelius privileges the Western notation system), Nami is designed to be culture general and flexible valuing cross-cultural exploration and accommodating a variety of cultural gestural language rather than imposing a culture specific framework or gestural language.



Figure 1. Nami in performance

5. PURPOSE VIA GESTURAL INPUT

Who is behind the input? Our bodies are innately tied to how we experience and often how we express socio-cultural habits, behaviors, and beliefs. Gesture is one form of embodiment in which we reveal our cultural body and its purpose. In this paper, the term *gesture* is generally defined as a human action with visual and musical intention. François Delalande (1988) divides these musical gestures into three categories [8]:

1. *Effective gesture*: “that necessary to mechanically produce sound” [8]
2. *Accompanist gesture*: “movements associated with effective gesture engaging the whole body but not directly related to the act of sound production” [8]
3. *Figurative gesture*: “wholly symbolic gestures of the performer” [8]

In her own writing, performer and ethnologist Tomie Hahn has expressed her interest in the bodily relationship between “a gestural controller embodying sonic feedback properties” through accompanist gesture [10]. *Pikapika*, a performance piece by Tomie Hahn and Curtis Bahn utilizes “SspeaPer”, a sensor and speaker array interface in which Hahn explores the *Pikapika* persona through *bunraku* (Japanese puppet theater) movements. She navigates her cyborg body and controls the musical texture and form using primarily accompanist gesture [11]. In this instance, Hahn’s lengthy history embodying her own culture, one built upon the Tachibana school of *nihon buyo* and specifically “Hatchobori”, the studio she studied one-on-one with her master (“iemoto”) contributed to her physical form and gestural language [12]. Hahn’s cultural body is present and strong through *Pikapika* largely due to the combined effort of generations of dancers before her influencing her and allowing the Hatchobori tradition to prosper.

5.1 Nami’s Purpose

My motivation to build Nami came from a desire to learn and develop new gestural language beyond effective gesture for trumpet (my primary instrument) and integrate that with my cultural body that draws deeply from the African American musical tradition, Western classical music, and my Nikkei heritage. The Japanese word *nami* means “wave.” In the musical and social context it can be interpreted as an embodiment of life experiences expressed in each musical beat that is free flowing and unrestricted by bar lines. The Nikkei, those

⁹ <http://www.christinemeinders.com/ai-design-tool>

¹⁰ <http://www.wekinator.org/>

who identify as Japanese immigrants and/or their descendants carry cross-cultural traditions. Their *minyō* is a song of life accompanying labor like the African American work song.

Augmented trumpets have existed since the late 1980s. Thibodeau and Wanderley define the *augmented trumpet* as “[the acoustic trumpet] onto which sensors have been mounted in order to provide extra sonic control variables.” [16]. The trumpet has been recognized as an ideal candidate for modification and/or augmentation because it has the bandwidth to support freedom of movement in the left hand while the right hand supports the instrument. Common augmentations include sensors located along the bell and leadpipe, valve pressure and positioning sensors, and various mouthpiece sensors. The fundamental relationship between the player and the trumpet exists between the player’s lips and mouthpiece then extends to the fingers. The coordination of the player’s air flow, mouthpiece buzzing, and valve combinations produces sound. The traditional gestures include valve pressing in the right hand, extending the first or third valve slides or utilizing various mutes and their accompanying gestures with the left hand. Existing augmented trumpet interfaces have largely depended upon traditional effective gestures and to a lesser extend accompanist gesture.

Nami is unique in that it privileges the exploration of accompanist and figurative gesture while allowing the performer access to multiple, simultaneous controls. The performer can play an instrument (trumpet) with the right hand, and in-real time manage multiple controls exploring, expanding, and amplifying the trumpet sound in the left hand. Thus far mapping parameters and gestures are performance specific and exploratory in design. In the following sections, I will present various inspirations in design for *Festival of Shadows: mapping invisible dance* (hereafter referred to as *FOS*), a Little Tokyo-based community performance.

6. INTENT VIA RULES AND BEHAVIOR

In the early stage of design, I was inspired by Laetitia Sonami’s gestural controller the Lady’s Glove and drew from her compositional and mapping framework. Sonami reflected in an interview with Tara Rodgers that “[technology] reflects how we see the world” and while the Lady’s Glove’s French “sexy and feminine” design was a social commentary and joking opposition to the hyper masculine Mattel Power Glove back in 1991 [13], this design choice complimented her choice to play with subtle sounds which she describes as “more feminine” [13]. Sonami’s work has been described as “performance novels” because it follows Sonami’s pre-determined template while musical form and narrative unfold and transform through her gestures [9]. To strike a balance between the unexpected and her intention, Sonami uses templates to provide structure to direct her intention but has the freedom to switch between them to allow musical freedom and interactivity. Within these templates, Sonami chooses which sounds to access and the parametric mappings each sensor connects to in Max/MSP. This structure versus freedom dichotomy is mirrored in her sound interests which lie in “recognizable elements and abstraction” – sampled sounds and abstract synthesis [13, 14].

My background as an improviser informed my decision to develop gestural vocabulary and sound worlds via embodied design improvisation (hereafter referred to as EDI) exercises. In the early stage of design, I used EDI as the basis for exploring physical gestures by establishing various physical scenario guidelines to explore. By structuring these situations, the player navigates the space using intuitive body language like Halprin’s exercises, acknowledging the restrictions imposed by the scenario, iterating multiple movement possibilities, and developing an initial set of requirements to improve the design.

In one iteration, I imposed the physical guideline of utilizing a single desk lamp as the only light source in the space. I used the action of switching the lamp on and off as the respective markers of the beginning and ending of the performance, the exposure of the light to the photoresistor to manipulate the movement of harmonies based on the trumpet’s pitch, and the mechanical noises of the lamp’s switch as an accompanying live input to be looped and processed as the basis of the musical performance. The main challenge I encountered was maintaining control over the sensors such as the FSR and flex sensors while using a twisting motion to turn on the light source. While this gesture was intuitive to complete the action of turning off and on the desk lamp switch, this gesture did not afford much freedom of movement for the sensed hand. Gestures that allowed easy access to the photoresistor on the inside part of the wrist were favorable and various hyper-controlled wrist focused gestures were explored, inspired by somatic movement and *butoh* (Japanese dance form).

EDI exercises like this influenced my compositional structure, mapping system, selection of sound sources, and gestural vocabulary for *FOS*. In August 2019, I collaborated with choreographers and +LAB artists-in-residence Isak Immanuel¹¹ and Marina Fukushima¹² to create *FOS* for intergenerational community performers and *butoh* master Oguri¹³. *FOS* was framed around a series of somatic movement workshops and movement scores reflecting on “invisible dances,” communal gathering, “ending cycles of displacement” in relation to the precarious borders of Little Tokyo in downtown Los Angeles [17], as well as rehearsal warm ups in which small warm bags filled with water were used to represent the body – a structure shaped by fluid movement in time and space. These water bags are placed on the body and moved around at the user’s will. The *soma*, “the body perceived from within” is what makes technique internal and personalized allowing performers to develop language outside of “canonically codified techniques” [19]. While some sections of the performance were composed such as the recreation of Michio Ito’s cross-cultural “Sylvia” performance (performed by Marina Fukushima) in which I performed the original music “Pizzicati” on trumpet with a practice mute, the subsequent loosely “Sylvia” [18] inspired iteration performed by *butoh* master Oguri was improvised with *butoh* ideology in mind.



Figure 2. *FOS* Performance – excerpt inspired by Ito’s interpretation of Léo Delibes “Sylvia” (Performer L-R: Oguri and Marina Fukushima) Photo Credit: Ken Honjo

Butoh is a form of dance, argued as an “essential element of all expression” regardless of dance genres developed in the late 1950s that rejects “ready-made culture” and enforces the idea that the body is molded by life and individual agency or in other words “individual history and experience” [20]. During the rehearsal process for *FOS*, I participated in rehearsal warmups and tracked the dancers’ movements and their shadows to better understand the narrative and the feeling of moving within the space in context to the other dancers. I developed gestural language by focusing on my own personal relationship to the performers, their movements, the sounds of their

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https://www.tableaustations.org/Tableau_Stations___Isak_Immanuel.html

¹² <http://www.discovernikkei.org/en/journal/author/fukushima-marina/>

¹³ <http://www.lightningshadow.com/OguriBio.html>

movements, and my interpretation of their emotional state. The result was slow hyper-controlled movements which mirrored the movement and energy on stage. During the rehearsal process, I composed multiple iterations of various sound worlds out of the trumpet output as well as the sound output of common objects typically found in or around my own *obaachan's* (Japanese grandmother) home such as dead leaves, uncooked rice, jars, paper and bells to create a narrative and call-and-response dialogue with the dancers' movements. While the sound design was relatively minimal providing the performer with some control intimacy, mappings were not all 1-1 so there was some room for performer/audience intrigue by not fully revealing perceivable cause/effect links between performer's gesture and sound output.

6.1 Form and Material

How does the cultural body inform form and materiality? Purpose and intent should be reflected in the form and material of gestural controllers, from the size and fit to the cultural aesthetic it is referencing. They also influence practical considerations such as durability (i.e. tensile strength, elongation, tensile stress, puncture resistant, tear resistant), breathability, ease of donning, grip, barrier protection, thickness, and length. While these practical considerations have clinical connotations, they also present an opportunity to think socio-culturally and creatively.

I used the CAIDT as a basis for prototyping multiple iterations of Nami. Nami's iterations were based on observation notes developed during embodied design improvisation sessions and performances with each iteration expanding the range of gestural motion and privileging specific target gestures in accordance to physical scenario constraints. Nami's materials were chosen out of accessibility only choosing materials that could easily be recreated on a low budget and used in a wide range of athletic or common activities. The first iteration was a modified junior golf glove made out of leather, nylon, and spandex with pouches lining the top of each finger to insert flex sensors and the pad of the thumb to insert and FSR. While the hand size is ideal for my small sized hands, the sensors often slipped out of the pouches easily during performance and the fabric thickness prevented me from feeling the sensors in the glove, making haptic feedback challenging.

The third iteration, based on a compression glove for arthritis sufferers stretches to fit hands of all sizes. In the spirit of Kaffe Matthews¹⁴ Sonic Bikes [15] project in which the "sensory bike" was built with and for the local Folkestone community, this too was community driven and created for SupplyFrame Design Lab's AI.Culture.Creativity event in 2019 for community members to try. This design was built upon the second iteration's design using a more flexible material to stretch and adjust to a wide range of hand sizes. The strap around the wrist allows the user to secure the glove and sensors in place however the fingerless design makes it so flex sensor placement is dependent on hand size. Users with longer fingers having more difficulty obtaining full range of finger bend data since the flex sensors are not covering all phalanges.

In *FOS*, sensors were added to accommodate interaction between new sound inputs and Nami. Since water was a continuous motif in the performance, I built a hydrophone based on Sasha Leitman's hydrophone design¹⁵ to record and process water in a bowl accompanying the movements of the dancers cleaning the stage floor. Future iterations have included sensors on the bowl (i.e. hall effect sensors) and in the water (i.e. water level sensor) for added interaction.



Figure 3. Nami's 1st iteration Figure 4. Nami's 3rd iteration

7. CONCLUSION

While there are a number of motivations for creating and performing music with gestural controllers, cultural bodies and cultural design methods have largely not been discussed in previous NIMES. I hope that my work with Nami will contribute to a larger ongoing development of Nikkei repertoire, electroacoustic trumpet repertoire, and the gestural controller community. As creative technologists continue to design for themselves, their communities, and/or collaborate with performers, it is my hope that the CAIDT encourages thinking about technological design in new and inspiring ways that resonate with the user and spark the curiosity to explore and extend their cultural bodies.

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