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Sensory Reload: Group Interaction with Touchable Sculpture

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Abstract

This paper discusses a collaborative practicum PhD thesis work in its final stages of production. The project inquires about the possibilities of the tactile sensation in art to reestablish human sensory relationship with the current technology. The series of interactive sculptures investigate tactile interaction as an aesthetic experience within the multimodal multisensory system. The silicone sculptures **Silicone Valley, Hemorrhage,** and **Disturbed System** aim to take visitor's experience with the artwork into unfamiliar sensory territory. Touch variations to the sculptural surfaces provide electronic feedback of embedded vibration and directional spatialized sound in an installation format. The artwork presents this sensory information in a form of unexpected assemblage of pulsing organic sculptural surfaces and emitting sound. It also places visitors in a shared interactive space, an aura of travelling sound warped by their touch to the sculpture. This shared interaction investigates relationships between nature, artifice, technology, human body and human social group behavior.

Keywords

Group interaction, touch, physical computing, haptic feedback, generative sound, consumer technology, spatialized sound, multisensory, immersive, information interfaces and presentation.

Introduction

This research project originates from the idea to metaphorically share artist's experience of touching sculptural material with the visitors. It exposes artist's perception in production process to transform the conception of the presented artwork into a creative active experience for the visitors [13,14]. Unlike visitors' experiences in exhibitions, artists

Figure 2. **The Silicone Valley**. The black hard plastic elements protruding from the breast tissue concentrate the vibration feedback and host the conductive copper wire of capacitive sensors.

Figure 1. **The Silicone Valley**, at Art Gallery of Grande Prairie [1] in 2014. Visitor encounters a flesh-like 27" breast with the internal tissue exposed. Black plastic 3D printed sensors in form of small mutating vaginas and nipples activate haptic feedback. In response to these sensors, the breast periodically buzzes an electronic pulse, subtly inviting visitors for closer interaction. The slowly pulsing buzzing subtly references breathing and heartbeat. The pulsing intensifies when several visitors touch multiple areas.

experience their work at a physical level during the fabrication process. Artists sense the scent of oil paint, the texture of modeling clay, and the varying resistance of carved stone. The connection between the artist and artwork happens through a full body experience, as explained by Brodsky [4] and Vallega-Neu [5] through Merleau-Ponty's and Dewey's theories about perception and embodiment [6, 15]. This connection is evident in Richard Serra's film Hand Catching Lead (1968) and Matthew Barney's relationship with prosthetic grade plastics and petroleum jelly in Cremaster Cycle (1994-2002).

Our project also shares the artists' social understanding of the medium used in assembling the sculptures. The silicone material evokes questions of its associations with the body augmentation. Embedded technology continues the theme of augmentation and comments on a comparison between physical computing and artificial life forms. Three sculptural installations recruit haptic technology [7, 16] and popular modes of interaction to explore variations of approaches to representation such artist's perspective. These approaches include presentations in a traditional art gallery, in a science centre, embedding under the surface and exposing sensors and actuators, investigating vibrational feedback, addition

of sonic data, experimenting with generated speech and music, and variations on social contexts of the works.

Tactile Aesthetics

Our research investigates the value of touch in perceiving art in a digital age, which initiates new challenges identified by Alan Kirby [10]. Among these challenges, invention of new materials, wearable technologies and hand-held electronics proves the traditional strictly visual experience of art unable to capture viewers' attention for extended period of time. The installations attempt to stimulate one's awareness of others, the environment and experienced sensations.

Scientific research in haptic psychology [11, 12], in combination with Saddik's survey of haptics [16] provide an understanding of how one perceives touch. Touch differs from other senses: it is distributed over the entire surface of a human body, promotes active exploration of physical environment, and conducts a bidirectional exchange between body and environment [11, 16]. Inclusion of the tactile sense, which cognitively is processed slower than vision, provides an artist the opportunity to extend visitors' engagement in an exhibition [8, 17]. The process of exploration involves a variety of motions on the surface of the sculpture. This includes skin contact, pressure, following surface contours and holding individual parts of the sculptural body. Temperature, body balance, and hand manipulation augment the comprehension of sculptural shapes.

The inclusion of tactile and sonic feedback into live interaction with sculptural objects establishes a temporal, sensory and experiential communication between the artist and the audience. This type of communication differs from observing visuals or the interaction with the screen in the way it creates a state of awareness of physical surroundings. We stimulate awareness of visitor's physicality by disrupting the familiar patterns of interaction [9, 12] with the generated feedback and incorporating timing into the experience. Pre-programmed timing allows to transform the experience with the work into a narrative structure.

Figure 3. Disturbed System (2015). The soft silicone material disguises 8 built-in speakers that emit directional sound along with 4 external spatialized speakers. The embedded sensors react to squeezing and pulling on the surface.

Sharing Touch and Its Social Context

A silicone sculpture of an enlarged breast, **The Silicone Valley** (refer to fig. 1 and 2), reacts to human touch by pulsing vibrations within the surface. Visitors get to touch the inside raw tissue of the breast embedded with 3D printed hard plastic sensors. The piece speaks about the issues of naturalness and artifice in the context of augmenting human bodies with technology and foreign material. It presents the viewer with one of the most touched female organs turned skin-side down and detached from the body. It also places the body part associated with intimacy into a context of group interaction in a public setting of the art gallery.

A second iteration on the theme of touching internal tissue evolves into a smaller piece **Hemmorhage** (fig. 4). The abstract shape of the sculptural piece references an internal body organ that pulses in a similar way to the previous work, however the sensors and actuators are completely inlayed within the sculptural 'tissue'. This presentation encourages motion in addition to placing their palm on the sensitive area. The search for sensor locations invites visitors to actively explore the surface of the sculture. Occlusion of the feedback mechanism speaks about the notion of art's mystifying of technology and romantisizing of it in science fiction. Touching **Hemorrhage** during the Calgary Maker Faire illustrates a contrast in visitors' relationship to art in a gallery to the science centre [18].

The current work, **Disturbed System** continues exploring human tactile interaction with silicone and technology. In this iteration the installation places visitors within a virtual immersive sonic environment within the physical exhibition space. Visitors are invited to touch an object that references disasembled body tissue. This object emits a synthetic, distorted voice speaking gibberish, which structurally reselmbles English. The voice changes over to playing notes once the visitors overcome their discomfort of the presented object and engage in touching the sculpture. The sensors

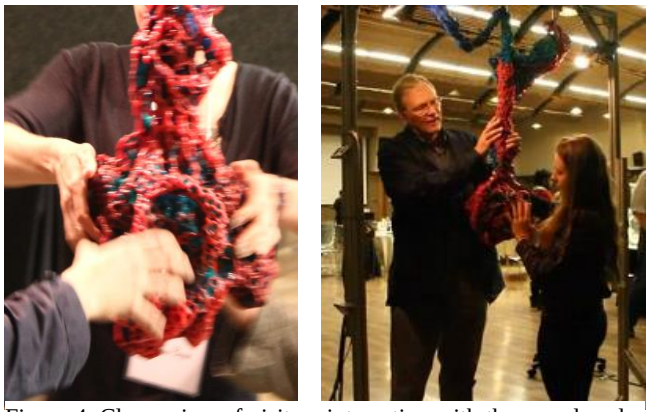

Figure 4. Closer view of visitors interacting with the sound sculpture.

within the surface allow recording the sequence of touched areas, each playing a separate synthesized note. The sculpture becomes a music instrument. Emitted sound travels to the outside speakers corresponding to the locations visitors' touches in relationship to the exhibition space. This spacialization effect allows simulating of a space aura which distorts based on the number of visitor's interacting with the piece. **Disturbed System** (Figure 3) evokes a feeling of dicomfort while presenting visitors with familiar technology disguised within an unfamiliar object. Combination of the tactile and sonic feedback draws visitors' attention to the familiar daily experiences of touching technology, authenticity of feedback, physical sensations, natural and artifice.

Conclusions

Our collaborative project allows creating a multi-sensory art environment for group interaction. We explore themes of physicality in visual and sonic arts by recreating a state of awareness inspired by artist's interaction with sculptural materials. The piece **Disturbed System** manifests our concluding explorations on the topic of shared interaction with touchable art; however, comparing other variations allows researching of the structure of interaction and its meaning in the different contexts.

Figure 5. **Hemorrhage** (2015) resembles an internal organ and evokes references to medicine, science fiction in a performative manner. Artist-performer invites the audience to touch it in artist's arms or when set laying on a table surface.

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