Le Monstré : An Interactive Participatory Performance Costume

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Abstract
LE MONSTRE is a responsive performance garment, changing the sound and projection of the performance space through audience interaction. As the audience is invited to investigate the garment through touch and pull, capacitive and resistive strain sensors relay the interaction as wifi MIDI signals. The garment was designed as an investigation into the technology and arts collaborative design process.

Author Keywords
Interactive Garment; Participatory Performance; Wearable Technology Costume

ACM Classification Keywords
H.5.m. Information interfaces and presentation

Introduction
When asked "Why work on performance led research in the wild" Benford et. al give three reasons. First among them is that Artists' uses of emerging technologies are often highly innovative and unusual, stretching the technology in unforeseen ways, highlighting new design values and approaches that are sometimes contrary to received wisdom in HCI, and opening up new areas of application [1]. We certainly found this to be true.

This project aims to make effective Dr. Bolter's quote that "the arts are the tip of the HCI sword" by enabling effective communication, creating useful artifacts, and engaging the technology community to catalyze processes by technologists and artists in showcasing

the work happening on an engineering campus. There often exist barriers in access, communication, and collaboration between artists and technologists. With a thoughtful plan to bring artists and technologists together in collaborative workshops, this engagement grant offers opportunities for artists to learn about engineering and technology creative processes, while also allowing experts in engineering and technology to see first-hand what artists need to relate to broad audiences in site-specific locations in their process and practice.

Figure 1 ©Clint Zeagler: Ideation Sketch for Le Monstré

The culmination of this project is a creative collaboration with a performance artist, to build an interactive garment that engages audience participation in her performance piece. The garment "Le Monstre" is a fun romping "fraggle rock" type creation that includes touch sensors, stretch sensors, distance sensors, and accelerometers. This work builds on a completed interdisciplinary project "The Hood" between the Technologists and an Italian musician [2].

Description of Garment and Use:

The performance garment is constructed of many different textures. Some of these textures include conductive materials, which act as capacitive sensors recognizing touch. Other portions of the garment contain ribbons that are attached to stretch sensors. Each of the sensing textures are designed to be explored through touch. Within the larger context of the performance's theme of connectedness through media, Le Monstré explores physical connectedness, and how that affects media.

Figure 2 © Safety Third Productions: Textures of Le Monstré

Figure 3 © Safety Third Productions: Buttons are sewn with conductive thread.

Figure 4 © Safety Third Productions: Copper fabric is made into interactive panels.

Figure 5 © Safety Third Productions: Conductive thread is tufted into shaggy yarn.

Figure 6 ©Clint Zeagler: The garment is designed to move easily even with the amount of tech included. It is also designed to zip up the front for ease of donning and doffing during the performance.

As members of the audience touch each interactive area of the garment a midi note (electronic signal) is sent via wifi to a laptop running a live concert program called Resolum Arena. As the program receives the note it plays an audio recording (in this case French words) and switches the lights and video content presented. LED lights sewn into sheer panels of the garment also glow more intensely with each touch to validate interactions.

Figure 7 ©Safety Third Production: Audience members interacting with Le Monstré during a performance.

This multimodal feedback envelops the audience and reinforces the touch interactions. As the audience starts to pull the ribbons from the furry pockets of the costume, bells chime with each tug. The performance ends in a living may poll to the sounds of temple bells played by the audience members interacting with the garment.

The garment also cycles through color of LED, changing quickly and popping strobes of white with faster harder movements from the dancer. This is accomplished with simple use of accelerometer data.

Figure 8 © Safety Third Productions: Tufts attached to ribbons of fabric pull from five pockets located on the garment.

Figure 9 ©Safety Third Productions: Audience members pulling the ribbons to "ring" bells. LED

Technology and Components

Le Monstré uses conductive materials (conductive thread, copper fabric, silver plated chains) to sense touch through capacitance. The garment also uses conductive rubber stretch sensors attached to fabric

ribbons to detect pulling. The costume incorporates an accelerometer to determine the intensity of movement.

The sensing is processed on a WICED WIFI Feather Board. The textures of the garment are connected to Adafruit Flora Boards, which in turn are connected to the WICED Feather. Each Flora Board has a chain of LEDs which light up the garment for performance but also give developer feedback during programming and setup.

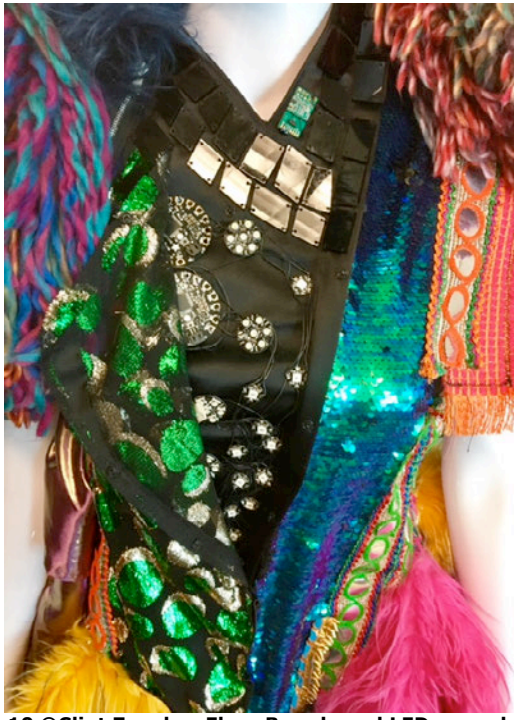

Figure 10 ©Clint Zeagler: Flora Boards and LEDs are placed beneath a sheer panel on the front and back of the costume.

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