TEXTILE + DESIGN LAB

Case study number: 05/2014

Project Title: Sonic Textiles

Researcher: Charlotte Alexander

Project Period: 2013-2014

Project Description:

This research project employed an interdisciplinary approach to explore the relationship between body and space, through experimentation and development of an interactive, knitted textile. The research incorporated a methodology that drew inspiration from 'hacking', with the intent to understand the importance of cross-disciplinary sharing, a hands-on imperative and openness within an academic research context. 'Slow technology' is used as a framework, allowing the outcome of the research to be concerned with reflection rather than efficiency: the reflection of the way in which we might continually reconcile and construct the relationships between technology and ourselves.

In order to engage with these methodologies, Charlotte made a number of knitted prototypes exploring the use of conductive yarns knitted into textiles in order to create sensors. The sensors were able to discern the amount of movement and stretch based on the degree of conductivity flowing through the textile. Bodily interactions with the textiles generated responsive sounds. The prototypes explored the efficiency of a number of different stitch structures, knitted on the Shima Seiki WholeGarment® machine, and culminating in two large scale pieces. The first prototype developed was a squab cushion, made to be interacted with through means of compression such as hitting, sitting, squashing or flattening. The second prototype was a frame covered with the knitted material, which when placed upright against a wall could be interacted with through stretch: leaning, pressing, distorting or straining. The interactions of the bodies with the textiles are sonified, or expressed through sound to create interactive and expressive work.

The testing process for developing the sensors was very simple as the work was being used for

artistic purposes and therefore the testing process was not as rigorous and sophisticated as it would have been for a commercial project. The textiles' sensitivity was measured initially by a multimeter (an instrument that can measure electrical signals), and then later using a microcontroller linked to a computer, computing real time graphs of the sensor data, which allowed the more successful knit structures and interactions (those with the larger range of data) to become apparent. The microcontroller used was an *Arduino*, an open source electronics prototyping platform, which is designed to be used by artists, designers and hobbyists.

The tests showed the importance of using a tighter knit structure, capable of stretching further to give more digital information. Similarly, the non-conductive yarns knitted alongside the conductive yarns altered the sensing capacity of the textile, depending on thickness and pliability. As a desired result of the prototypes was interactivity, more movement in the fabric generated increased responsive sound.

Conference Papers:

Alexander, C. (April 2014). *Transformative Textiles: Integrating material and information in the design of sonified textiles.* Shapeshifting Conference, AUT University Auckland New Zealand. (Conference contribution).

Alexander, C. (2013). *Sonic Textiles* (Unpublished Master's thesis) AUT University, Auckland New Zealand.

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Images:

Figure 1 Images of prototypes and final works, C Alexander, 2013