

# INTOUCH: EXPLORING AMBIENT REMOTE TOUCH

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## Resumen

*InTouch* es un conjunto de vestidos que consiste en un vestido para una madre y un vestido de niño para compartir información de contacto a través de las prendas de una manera ambiental. Este fue desarrollado para explorar cómo la sensación de tocarse a distancia puede transmitir emociones y ayudar a las personas a mantenerse conectadas desde ubicaciones remotas. Se sabe que el tacto es una sensación inmediata con un significado emocional, de una manera que las palabras no pueden expresar. El tacto es tan importante para la existencia humana que se puede concebir en un niño que crece. Por lo que es inimaginable para el desarrollo de un niño carecer de la experiencia del tacto. Este proyecto fue creado basándose en la experiencia personal del artista con su hijo. En *InTouch*, un padre puede aumentar la intensidad de su conversación con un niño a través del tacto contextualizado, y los seres queridos pueden mejorar el tono afectivo de sus comunicaciones utilizando una tecnología táctil remota. Los vestidos *InTouch* se han creado utilizando técnicas de circuitos suaves. Todos los componentes electrónicos para sentir el contacto humano y activar el cambio de color, están integrados en los principales tejidos.

Palabras clave: WEARABLE COMPUTING, RELACIÓN INTERPERSONAL, INTERACCIÓN ENTRE PADRES E HIJOS, TOQUE REMOTO, CAMBIO-COLOR EN VESTIDOS.

### Abstract

*inTouch* is a set of dresses that consists of a mother's dress and a child dress sharing touch information through garments in an ambient way. This was developed to explore how remote touches can convey emotion and help people maintain being connected between remote locations. It is known that touch is immediate in that it carries emotional meaning in ways that words cannot express. Touch is so critical to human existence that one can conceive of a child growing up. So it is unimaginable for a child's development devoid of touch experience. This project was created based on the artist's personal experience with her child. In *inTouch*, a parent can increase the vividness of her conversation with a child through contextualized touch, and the loved ones may enhance the affective tone of their communication using a remote touch technology. *inTouch* garments have been created using soft circuit techniques. All the electronic components for sensing human touches and actuating color-changing garment were integrated on the main fabrics.

Keywords: WEARABLE COMPUTING, INTERPERSONAL RELATIONSHIP, PARENT-CHILD INTERACTION, REMOTE TOUCH, COLOR-CHANGE DRESS,



Fig. 1. A mother's dress (left) and a child's dress (right) of *inTouch*

## 1. INTRODUCTION

Human interpersonal touch plays an important role in our social interaction in expressing affect and fostering intimacy. It is a special conduit through which humans convey love, comfort, care, trust, support, and appreciation. Touch is immediate in that it carries emotional meaning in ways that words cannot express. *inTouch* consists of a mother's dress and a child dress (See Figure 1). They share touch information around the child dress and visualize it on the mother's dress. This paper describes conceptual and technical details of *inTouch*.

## 2. CONCEPT

### 2.1. ARTIST'S FIRST-PERSON STORY



Fig. 2. Skyping with the artist's son

When my son was one year old, he stayed with his grandparents in Korea apart from my husband and myself. Even though I was able to see him everyday via Skype and watch videos of him recored by my parents over and over, I struggled emotionally very much because I wasn't able to feel him. I felt I was missing many important moments of my son's life at that time. I wanted to feel softness of his skin and smell from his body. I wanted to touch him and wanted to be touched by him. Since he wasn't able to communicate verbally at that time, a physical touch was a very important communication between us. Apparently, I often holded and

hugged a cushion that my son used to play with and I even smelled it. That really helped me to feel the presence of him in my place. As an artist, I wanted to capture that moment as a tangible

artwork exploring the concept of remote touch. I developed *inTouch* to explore how remote touch may keep its primal role in affective interaction in an ambient way. The final outcome and the process of *inTouch* really helped me to get immersed in the parent-child relationship and get overcome the emotional challenge.

## 2.2. REMOTE TOUCH

Touch as a physiological phenomenon can be classified in two ways. The first relates to the sensory perception of touch – whether it is cutaneous or kinesthetic (Kaltzky, 2002). Cutaneous perception is obtained from the sensors in skin, responding to texture, temperature etc. Kinesthetic perception is sensed through the receptors in muscles and joints, enabling the awareness of limb position, and the ability to perceive force. The second classification relates to active or passive sensing (Loomis, 1984). Active touch is sensed by the person who initiates the touch and passive touch is sensed by the person being touched (Wang, 2010). In *inTouch*, the artist experiments these classifications via physical visualization using thermochromic paints in an ambient way.

“Remote touch” is the ability to produce physical sensations without physical interaction (Teh, 2008). This concept has been experimented and created by artists and researchers. However most of projects focus on direct communication producing physical sensations (i.e. tingling sensation). It has been used to get remote persons attention or make them alert, then telepathically send them a simple message. However in *inTouch*, the artist focus on creating an affective/shared moment that any parent-child relationships should have via an ambient visual effect on the garment.

## 3. IMPLEMENTATION

*InTouch* has been developed in focus of three technical approaches: soft circuit, networked garments, color changing garment.

### 3.1. SOFT CIRCUIT



Fig. 3. Soft circuit of *inTouch*

The *inTouch* garment is constructed from iterative explorations of soft circuits using conductive fabric, yarn and thread as well as Lilypad Arduino boards with a capacitive sensing circuit and a heat control circuit. The aesthetic and material properties are shaped equally by the needs of the electronic elements, material characteristics of the textiles and qualities of the wearer’s physical movement. Placement and organization of the sensors is guided by body ergonomics, somatic expertise in

‘meaning through movement’ and interaction design. Together these material explorations combine to guide the design of aesthetics. Tactile interaction creates playful, intimate environment where the quality of a tactile gesture can be exchanged collectively.

### 3.2. NETWORKED GARMENTS

In *inTouch*, the mother’s garment and the child garment communicate wirelessly via an Xbee and Lilypad Arduino. The child dress has five touch sensitive spots that look like flowers. When they are triggered by human touch, the green pattern of the flower changes

its color to yellow and the touch signal is sent to the mother's garment. The flower on the mother's dress mapped to the sensor on the child's dress changes its color from dark pink to white. This creates not an immediate alert rather an ambient experience.

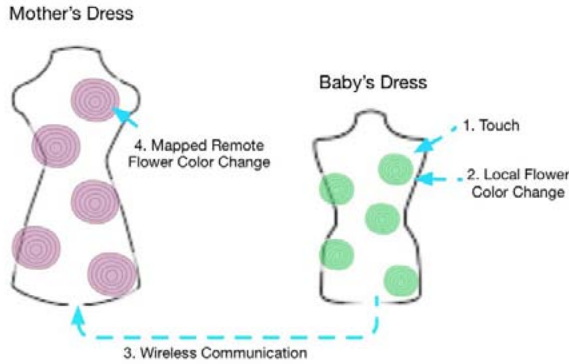


Fig. 4. inTouch's system diagram

### 3.3. COLOR CHANGING GARMENT

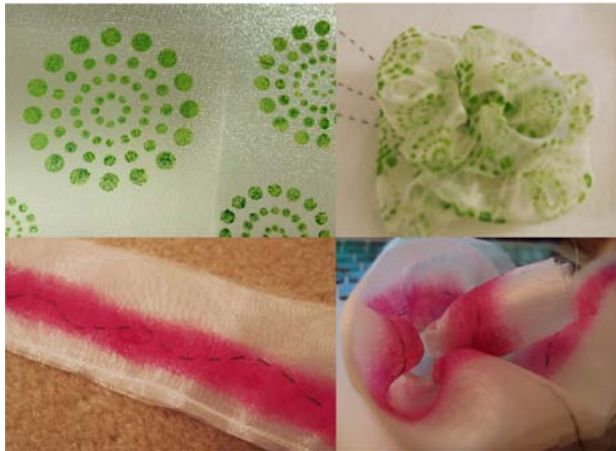


Fig. 5. Color changing garment using Thermochromic paints: child's dress (top), mother's dress (bottom)

The color changing aspect of the project has been utilized using thermochromic color powders from Solar Color Dust. Thermochromic powder is heat sensitive and the transition temperature to a different color is 86F. For the child's dress, green color powder was mixed with fabric medium and yellow acrylic paint. The mixed paint was applied to the fabric using a stencil technique (See Fig. 5. top). For the mother's dress, conductive thread was stitched on the surface of pink thermochromic paint and assembled as a flower (See Fig. 5. bottom). The conductive thread was used as a heat source and connected to the heat control circuit. The color change using thermal materials tends to be slow. Sometimes it is hard to recognize changes but it creates a passive or ambient wearable environment. This helps a mother feels always so close to the child's daily life including physical movements and interaction with surroundings.

## 4. CONCLUSION

*inTouch* explored the concept of remote touch between a parent and child using color changing garments. The artist took a poetic approach than a practical approach. Even though the design of the dresses has a certain style, the concept was realized as a tangible form and the technology was implemented to two wearable garments. It can be expanded to different designs (i.e. cushion or toy) and applications to investigate qualities of tactile experience. Wearer-friendly designs are suggested to be worn in the daily life.

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