

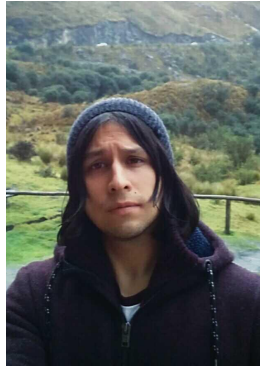
| Team 7: Fontayne, Juan, Maisie, Mike

BACKGROUND RESEARCH

Meet the Team



Fontayne



Juan



Maisie



Mike

Themes

Passive vs. Active

Some interactions were passive in that people were not required to directly interact with a prototype, like telepresence. In contrast, active interactions required people to engage in an activity as part of the connection.

Data-Driven Metrics

Several interactions used biometric indicators to output some form of data to track patterns and learning.

Directionality

Some interactions are bidirectional in which two people are required for input and/or feedback while others are unidirectional without requiring input and/or feedback from others.

Synchronous vs. Asynchronous

Users can interact at the exact same time (synchronously), or alternatively, interact through the objects/ artifacts at different points in time (asynchronous), e.g. recorded playback.

Themes Cont.

Children & Family

Several prototypes were inspired by traditional family activities like cooking, playing, and storytelling in attempt to facilitate and maintain familial bonds.

Present Moment

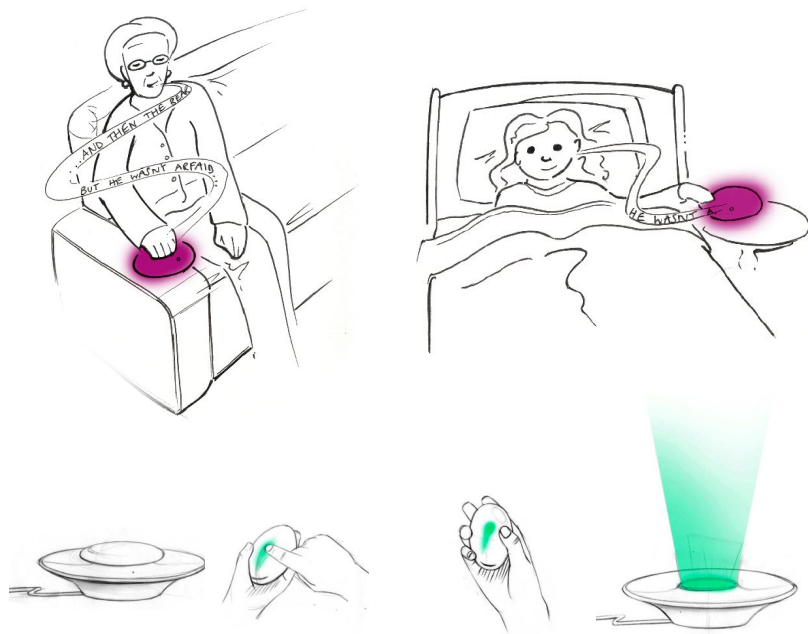
Real-time interactions that happen in the moment can be a powerful symbolism of one's presence.

Transformation of Senses

The output can engage human senses that are different from the input, including sound and music, light, haptic feedback like pressure and temperature

Simulation

Digital mediums are generally used to simulate/emulate the physical experiences we have in the real world.



InTouch Tactile Tales: Haptic Feedback and Long-Distance Storytelling

How It Works

Users squeeze pebble to send a signal to another pebble, causing the second pebble to vibrate and light up depending on the strength of the squeeze. Once activated, users can send touch-based messages. The docking station projects images and illustrations on ceiling or wall of the chosen story and transmit the reader's voice in real time.

Intended Purpose

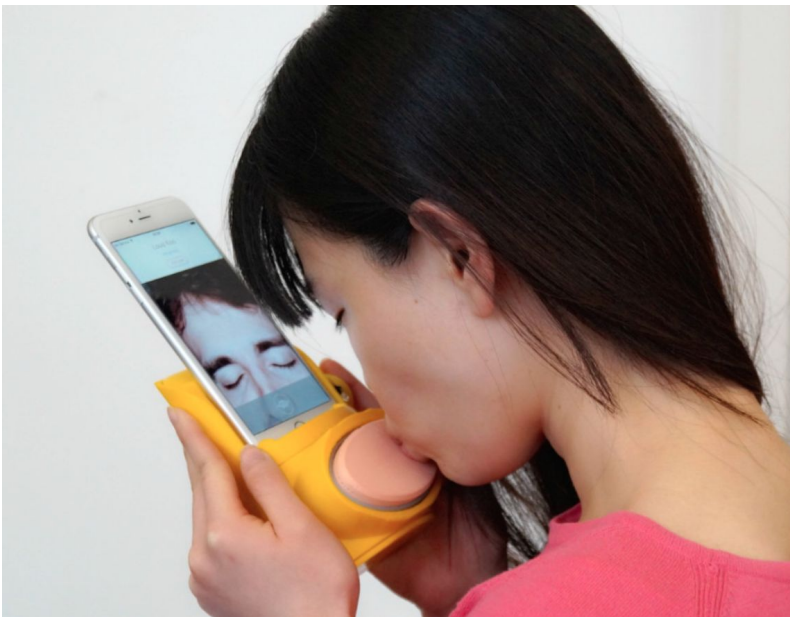
To connect children with distant family members and relatives through storytelling and tactile haptics.

Why

Lack of technology that children can use without adult supervision to communicate with family members. Additionally, communication in children revolves around play not texts, phone and video calls.

Theme(s)

Haptic, bidirectional, active, synchronous, children and family



Zhang, E. Y., Cheok, A. D., Nishiguchi, S., & Morisawa, Y. (2016). Kissenger: Development of a Remote Kissing Device for Affective Communication. *Proceedings of the 13th International Conference on Advances in Computer Entertainment Technology*. doi:10.1145/3001773.3001831

Designing a Multimodal Haptic Device for Virtual Kissing

How It Works

Kissenger connects to mobile phones. User places their mouth onto the device, which measures the lip pressure of a user during a kiss. Device sends real-time force feedback to the other user, simulating the haptic sensations of kissing.

Intended Purpose

Allows humans to express intimacy and emotions remotely through mediated kissing, especially between romantic partners, thereby enhancing their presence. Additionally, this prototype creates new interactions between humans and robots that extend beyond cognitive processing.

Why

Traditional digital communication focuses on language and verbal communication, but physical touch is a more effective communication tool.

Theme(s)

Active, haptic, bidirectional, present-moment, synchronous, simulation



Werner, J., Wetzsch, R., & Hornecker, E. (2008). United-pulse: Feeling your partner's pulse. *Proceedings of the 10th International Conference on Human Computer Interaction with Mobile Devices and Services - MobileHCI '08*. doi:10.1145/1409240.1409338

United-Pulse: Feeling Your Partner's Pulse

How It Works

Each partner receives one ring. Ring contains a pulse measure system that measures the wearer's heartbeat and sends it to the counterpart ring. Anytime one partner wants to feel their partner's pulse, they must press the gap in the ring with their finger.

Intended Purpose

To create remote intimacy between partners who are apart and allow them to experience the sensual touch and physiological presence of the loved person.

Why

Creating a technology that enables one partner to feel close to the other partner without the other partner doing anything. Projects aimed at creating intimacy often focus on sending their partners a message, but couples report they missed the feeling of body contact when their partner was away.

Theme(s)

Passive, unidirectional, asynchronous, present moment, data-driven metrics



Chai, M. Z., Soro, A., Roe, P., & Brereton, M. (2017). Cooking Together at a Distance: Sustain Connectedness for Long Distance Families. *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*. doi:10.1145/3027063.3053183



Cooking Together at a Distance: Sustain Connectedness for Long Distance Families

How It Works

When the user presses a button on the Performance Apron, the Talking Bottle records any ambient sounds, messages, or conversations at that moment. Recordings are sent to corresponding device to be replayed. The bottle glows in different colors to communicate a cooking event or that a message has been received.

Intended Purpose

Enhance and share the experience of cooking together with family and friends at a distance.

Why

People had desire to connect with distant family members and friends, but current technologies are unable to communicate a “moment” effectively, especially in a kitchen where technologies often get in the way because they cannot respond to the messy, performative, and communicative needs while cooking.

Theme(s)

Present moment, asynchronous, active, unidirectional, children and family

Mom is in
remote place



Before Hug



Hugging lower body

Child feels
Virtually Hugged



Huggy Pajama: A Parent and Child Hugging Communication System

How It Works

The mobile doll is embedded with pressure sensing circuits used to send hugs. The haptic jacket is embedded with air actuating modules that produces the hugging sensation. The doll contains 12 sensors that corresponds to the 12 modules in the jacket. When the user gently squeezes different parts of the doll, the jacket simulates the feeling of being hugged on the wearer in that area.

Intended Purpose

Enable parents and children to hug each other and promote physical interactions remotely when they are unable to be together at the same place.

Why

Textual, visual, and audio communications do not let people to fully express their intended feelings, especially for young children who are not able to communicate by words.

Theme(s)

Haptic, simulation, transformational of senses, passive, unidirectional, children and family,



Call Me, Choke Me (2008)

Gunnar Green (German, born 1978) Design Interactions Department (est. 1989) Royal College of Art (UK, est. 1837)

Object

Leather collar with electronics that receives data and tightens the device.

How it works

Through phone calls or text the device tightens the collar around the user's neck until they can not tolerate it any longer. A string pulled by the user loosens the collar and resets the device.

Intended purpose

To tie the use of mobile phone activity to the practice of erotic asphyxiation

Why

To demonstrate the contradictory nature of the pleasure and pain of being sought after and our complaints of feeling drained through the use of our mobile devices.

Themes

Simulation, transformation of senses



Prayer Companion (2010)

*Interaction Research Studio (est. 2000) Goldsmiths (UK, est. 1891)
University of London (UK, est. 1836)*

Object

Stand made with a photopolymer resin with integrated dot-matrix display, and printed circuit board

How it works

The device receives aggregated data of topics that are of potential interest to the nuns from RSS feeds and social media networks. These topics are then displayed on the dot matrix screen for them to see

Intended purpose

Alerts nuns of the Order of Saint Clare of issues going on in the world that require their prayer.

Why

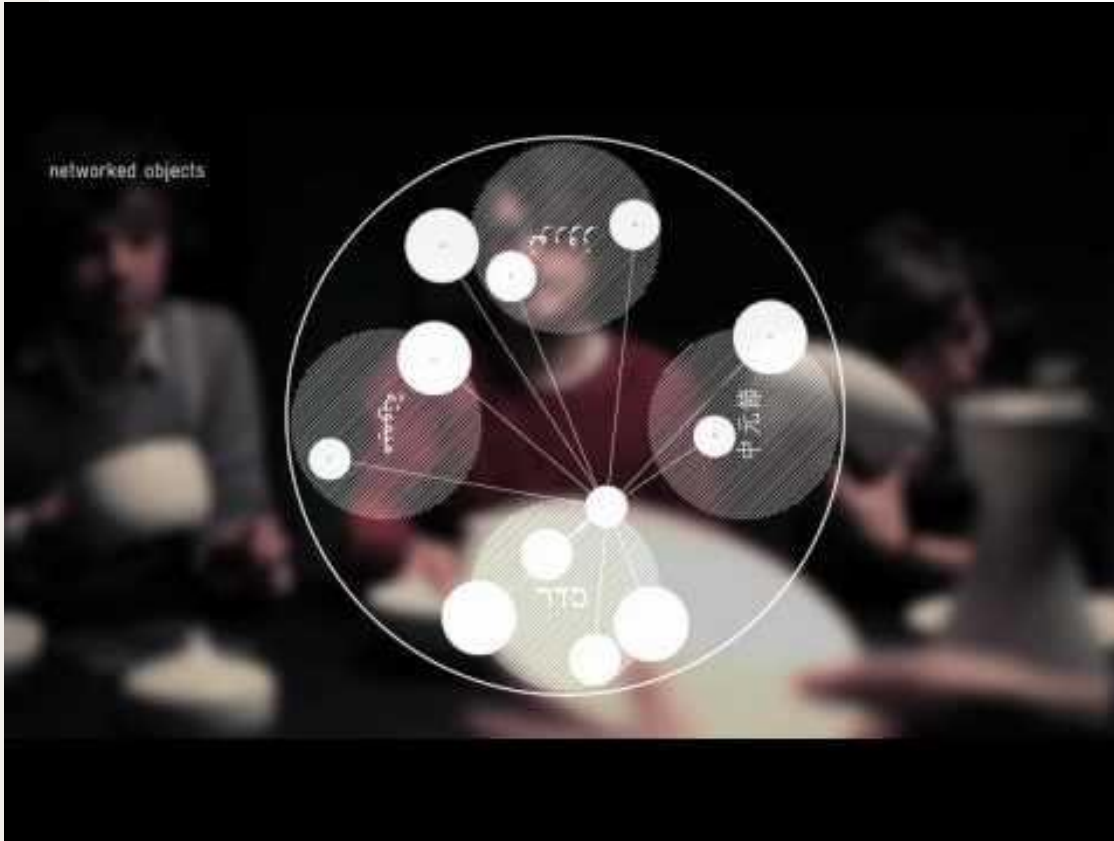
The nuns live a very solitary life with limited modern connections to the outside world. The device is a means for them to be able to find contemporary events that concern them and their prayers.

Themes

Unidirectional, data-driven metrics, asynchronous

Gover, W., Blythe, M., Boucher, A., Jarvis, N., Bowers, J., & Wright, P. (2010). The prayer companion: openness and specificity, materiality and spirituality. Proceedings of the 28th international conference on Human factors in computing systems - CHI '10, 2055-2064.

<https://dl.acm.org/doi/10.1145/1753326.1753646>



Whispering Table (2009)

Object

Multiple ceramic tableware objects with integrated electronics

How it works

Audience/user are invited to lift up the tableware to listen to different audio bits which change according to the arrangement of where the objects are located on the table.

Intended purpose

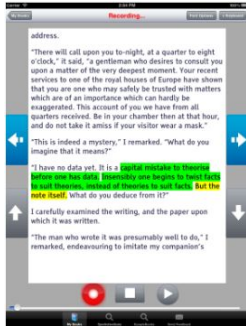
To introduce different rituals and practices of food from different cultures, and their similarities and peculiarities

Why

To provide a socially dynamic interactive system which permits the discovery of the interrelationships between food and religion.

Themes

Family, Active, Unidirectional



Abbas Attarwala, Cosmin Munteanu, and Ronald Boecker. 2013. An accessible, large-print, listening and talking e-book to support families reading together. In *Proceedings of the 15th international conference on Human-computer interaction with mobile devices and services (MobileHCI '13)*. Association for Computing Machinery, New York, NY, USA, 440–443.

DOI: <https://doi.org/10.1145/2493190.2494658>

ALLT: An Accessible, Large Print, Listening and Talking E-book to Support Families Reading Together

Object

E-book reading application called ALLT (Accessible, Large-Print, Listening and Talking)

How it works

It enhances the capabilities of an e-book with customizable and intelligent accessibility features that provide support for asynchronous reading by synchronizing the audio recording of one user with the text that is later read by another user.

Intended purpose

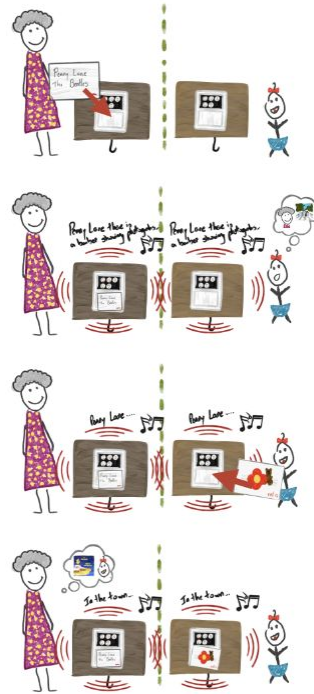
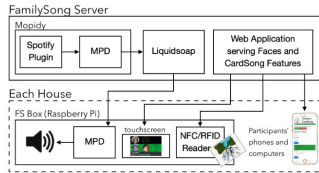
To help address the needs of multiple users to read together with a loved one. For example, children being able to replay an interactive story previously read together with their grandparents, or a visually impaired adult reading with a loved one.

Why

Reading is an activity that is not only pleasurable and informative, but also boasts significant social benefits such as familial bonding between parents and their children. However, due to a variety of reasons, such as busy schedules, parents working at a distance and other factors, the opportunity to read together is lost.

Themes

Asynchronous, Children and family



FamilySong: A Design for Managing Synchronous Intergenerational Remote Music Sharing

Object

RFID cards called SongCards with boxes that contain a Raspberry Pi, stereo speakers, a touch-screen, and an NFC reader to be used with the SongCards..

How it works

The core of the system are the SongCards, which when used, the music tied to it will play simultaneously on the devices of participating family members in their respective location. These cards can also be decorated with markers to help identify what song is tied to it.

Intended purpose

FamilySong helps remote intergenerational family members create opportunities for connection by facilitating a synchronized shared-music environment between participants' homes. These shared experiences can be referenced in subsequent mediated conversation which reinforces familial bonds.

Why

Often, the shortcomings of current technology make interaction through video-chats or phone-calls insufficient or even disappointing making it necessary to find other means of creating social and/or intimate contact. As well, the ability to decorate each CardSong provides a medium for interpretation and expression for all ages.

Themes:

Synchronous, bidirectional, children and family, present moment

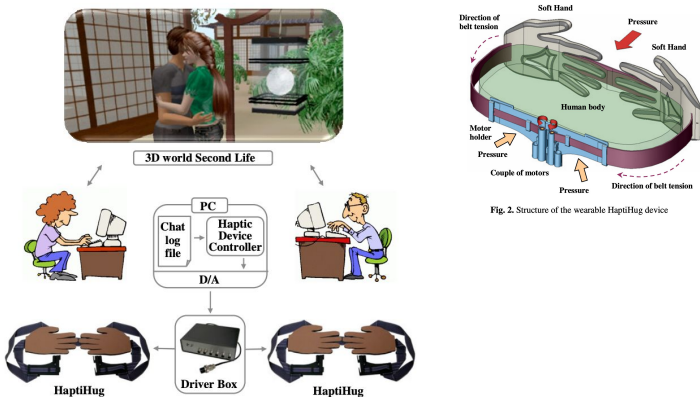


Fig. 1. Architecture of computer-mediated communication system with hug display HaptiHug



Fig. 7. Demonstration at ASIAGRAPH 2009

Tsetserukou, D. (n.d.). HaptiHug: A Novel Haptic Display for Communication of Hug over a Distance. In *Haptics: Generating and Perceiving Tangible Sensations* (Lecture Notes in Computer Science, pp. 340-347). Berlin, Heidelberg: Springer Berlin Heidelberg.

https://alliance-primo.hosted.exlibrisgroup.com/permalink/11/vbsh/TN_cdl_springer_books_10_1007_978_3_642_14064_8_49

HaptiHug: A Novel Haptic Display for Hug over a Distance

How It Works

Chat messages and visualizations in Second Life are analyzed in real time for hugs, sending a signal to the haptic device including Hug intensity and duration.

Intended Purpose

To foster empathy and personal relationships through a realistic hug sensation that is connected to online real-time communication application (e.g. Second Life)

Why

Online communication often leaves out physical contact, which is an important part of communication. Previous “hug” devices do not feel realistic as they do not account for the same physical feeling or visual representation of the hug that occurs simultaneously (on Second Life)

The combination of real-time messaging and hug in response to messages and on-screen animation is key.

Theme(s)

Active, Bidirectional, Synchronous, Simulation



Figure 1: Mobile technology prototype in context

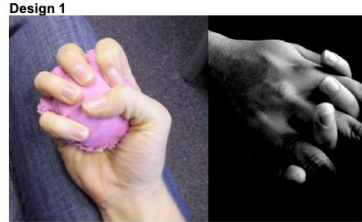


Figure 2: Design for intertwining fingers



Figure 3: Design for clasping hands

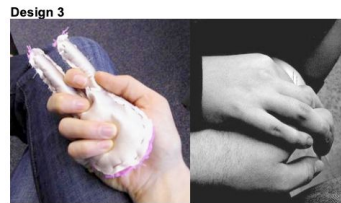


Figure 4: Design for wrapping fingers

O'Brien, S., & Mueller, F. "Floyd." (2006). Holding hands over a distance: Technology probes in an intimate, mobile context. *Proceedings of the 18th Australia Conference on Computer-Human Interaction: Design, Activities, Artefacts and Environments*, 293–296.
<https://doi.org/10.1145/11228175.11228226>

Technology probes for holding hands while apart

Summary

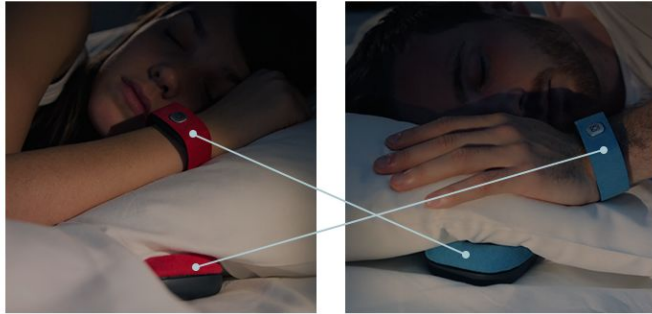
Various design probes were created to explore the concept of couples holding hands while apart.

Key Points

- Probes were designed to be mobile (can carry around)
- Appearance of the probe affected participants' willingness to hold it in public
- Probes were not designed well to engage participants
- Participants wanted a probe that was easy to carry, personal, fits in pocket
- Consider form and materials
 - Preferences varied depending on how participants liked to hold hands in real life
 - Texture and fabric made a difference
 - Some probes had "ribs" like real hands, or places where your fingers could be "intertwined"

Theme(s)

Passive/ Active, Present Moment, Synchronous, Simulation



<http://www.littleriot.com/pillow-talk>

PillowTalk

How It Works

Each person has a wristband that measures their heartbeat while they sleep and a speaker that can be put under their pillow. As you sleep, the sound of your partner's heartbeat plays through the speaker.

Intended Purpose

For couples who are apart or long distance to achieve a feeling of closeness and intimacy.

Why

It's hard to be apart!

Theme(s)

Passive, Bidirectional, Synchronous, Simulation, Transformation of senses

LumiTouch: An Emotional Connection Device

How It Works

Interactive picture frames with multiple communication modalities:

Passive: If one user is in front of LumiTouch, the other emits ambient lighting to indicate their presence and possible availability for more interaction, i.e. phone call

Active: Picking up the frame and squeezing it results in feedback on other frame depending on duration, pressure, location of the squeeze. The other user can respond accordingly.

Intended Purpose

Allow connection and communication and encourages creativity, emotional connection and development of personal languages between users as they send colour mixtures and patterns through squeezes.

Why

Picture frames were the chosen medium as photographs are a commonly-used means to feel connected with loved ones.

Theme(s)

Passive/ Active, Uni/bidirectional, A/synchronous, Present Moment, Transformation of senses



Figure 3: (Clockwise) A LumiTouch when off, a user working with LumiTouch in passive mode, the feedback panel on top lights up when sending a message, the display lights up when receiving a message, a user interacting with LumiTouch.

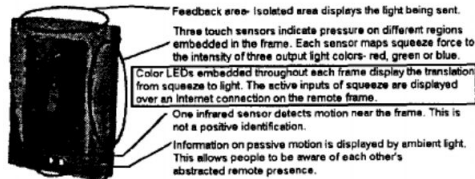
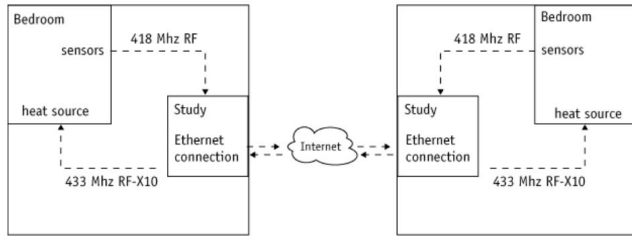


Figure 1: Components of the LumiTouch system



Goodman, E., & Mislim, M. (2003). The Sensing Bed. Proceedings of UbiComp 2003.

Sensing Bed

How It Works

Sensors inside a set of mattress pads determine the positions of the users and transmits the data every five minutes to the other bed. Heat is released in the other mattress pad at the exact coordinates of the users.

Intended Purpose

Telepresence - communicating presence of someone who is not physically. Sensing Bed is for use for those who would normally sleep together, but cannot.

Why

A bed is symbolic for couples: emotional and physical connection, place of unification, presence of the partner displayed through heat. Designed for “emotional resonance” and reflection on the absence of the partner in the moments before sleep.

Theme(s)

Passive, Bidirectional, Synchronous, Simulation, Present Moment

CurBall: A prototype tangible game for intergenerational play

How It Works

A collaborative bowling game between senior and junior players that can only be played by working together. The goal of the game is to let a virtual ball roll from start to finish without touching any of the physical obstacles. The Senior sees the ball and obstacles on a virtual screen but cannot move objects. The Junior cannot see the ball, and needs commands from the Senior to successfully navigate the obstacle.

Intended Purpose

Intergenerational collaborative play between grandparents (Senior) and grandchildren (Junior).

Why

To consider playful approaches to ubiquitous computing for older people that promote family connection, communication, social interaction instead of focusing on health and illness.. Grandparents are often motivated to use technology if it involves playing with their grandchildren. These approaches can help older people increase their comfort with technology.

Theme(s)

Children & family, Active, Simulation, Synchronous



Figure 1. Senior Equipment: the ball and a computer (left). Junior Equipment: the game field with the colored objects (right)

figure 5. The current prototype is a scarf with large pockets with a power supply. The design of the scarf is intended to make it wearable in a number of ways and allow specific TapTap actuators to be mounted wherever the wearer desires. The outside of the scarf is a public color (gray) while the inside and its intimate actuators are a warm color (pink).



figure 4. In the most recent prototype, the flexible i/o haptic insert tucks into the felt scarf (left) and connects to central power through conductive steel snaps (right).

Bonanni, L., Vaucelle, C., Lieberman, J., & Zuckerman, O. (2006). TapTap: A haptic wearable for asynchronous distributed touch therapy. CHI '06 Extended Abstracts on Human Factors in Computing Systems, 580-585. <https://doi.org/10.1145/1125451.1125573>

TapTap: A Haptic wearable for asynchronous distributed touch therapy

How It Works

A garment with sensors and actuators that record touch simulations and play it back later when needed. Touch can be customized and the garment can be worn in multiple ways.

Intended Purpose

To provide recorded and personalized tactile feedback asynchronously for use in therapy or other times when comfort or affection is desired.

Why

Recording and playback of touch means it is available whenever we need it. It can be used by a child for comfort when their parent is not around or emotional therapy when otherwise necessary.

Theme(s)

Asynchronous, Unidirectional, Present Moment, Simulation

PLAY ME: interactive sonification of sexual arousal in long-distance relationships

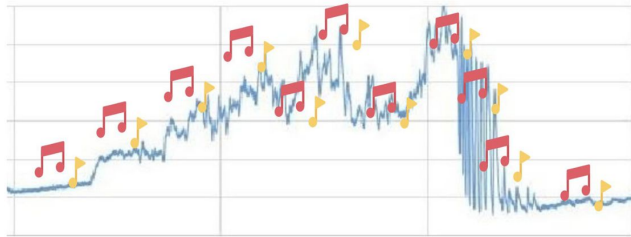
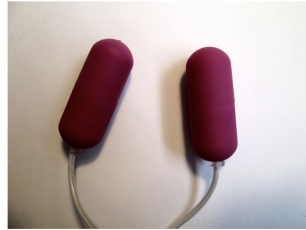


Figure 22: Mapping of pelvic muscle tension to pitch.

Arnold, R. (2020). PLAY ME: interactive sonification of sexual arousal in long-distance relationships, Paladyn, Journal of Behavioral Robotics, 11(1), 250-270. doi: <https://doi.org/10.1515/pjbr-2020-0014>

How It Works

A tiny pneumatic anal probe connected to a pressure sensor and vibrators. Three sensors capture genital sexual arousal and transform it into music by mapping measured biometric data to pitch. The vibrators in the bodysuit are controlled by sound that is generated by the partner using any audio source.

Intended Purpose

Using a gender-neutral Arduino-based system, it allows partners in a long-distance relationship to perceive each other's sexual arousal and to provide stimulation of erogenous zones using music.

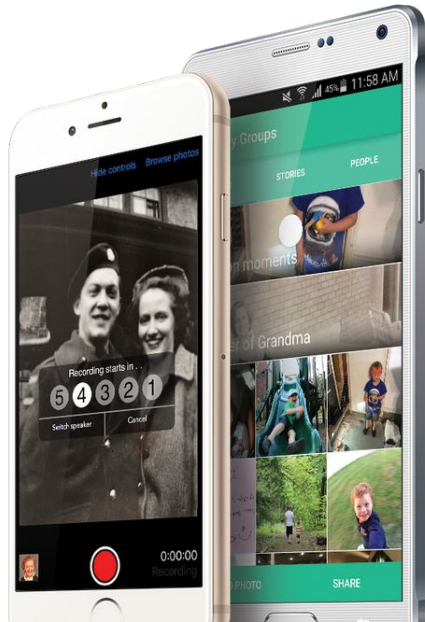
Key point

Transforming physiological orgasm into music (the manifestation of feeling into the sense of hearing)

Theme(s)

Data-Driven Metrics, Synchronous, Transformation of senses

everyStory: record personal color commentary to a photo



How It Works

People can scan digitize old family photos, and record personal commentary to a photo, so that a storied narrative is attached to each photo.

Intended Purpose

A large part of staying connected to family is knowing where your family members came from and understanding more of their life experiences.

Key point

Digitizing a family activity, combining senses (hearing and visual)

Theme(s)

Children & Family, Asynchronous



<https://cutecircuit.com/hugshirt/>



HugShirt

How It Works

The Hug Shirt is a shirt that lets you send hugs over distance. Embedded in the Hug Shirt there are actuators that recreate the sensation of touch and the emotion of a hug. One can send shirt wearer a hug using the Hug Shirt App.

Intended Purpose

When people are deprived of tactile contact for a long period of time, people get depressed. Humans need physical contact with each other and this digital technology allows for a virtual pleasant Human-Human Interaction.

Key point

Tactile sensation

Theme(s)

Synchronous, Present Moment, simulation

Cueb: Facilitating parent-teenager communication through interactive photo cubes



Golsteijn, C., van den Hoven, E. Facilitating parent-teenager communication through interactive photo cubes. *Pers Ubiquit Comput* 17, 273–286 (2013).
<https://doi-org.offcampus.lib.washington.edu/10.1007/s00779-011-0487-9>

How It Works

Every family member has his or her own digital photo cube, which shows photographs on six sides. Shaking the cube displays random photographs of experiences this person had without the other family members.

When pressing a photograph inwards, this photograph will be locked and used as selection filter for themes of the photographs; for example, locking a photograph of a birthday party in the summer may generate other photographs of birthday parties or photographs taken in the summer.

Finally, photographs can be switched between cubes by holding two cube sides together.

Intended Purpose

Studies show that teenagers have a substantial interest in getting to know their parents and their parents' past. Cueb facilitates these communication about the past of the parents.

Key point

Communication between objects. Tactile interaction with tangible object

Theme(s)

Children & Family, synchronous, active

The Magic Box and Collage: Responding to the challenge of distributed intergenerational play

How It Works

The grandparents and the children each has a Magic Box which they can put objects such as gifts, toys, photos, souvenirs, messages and other special things in. Each evening a 'Magic Box fairy' (in reality a hard working researcher) exchanged the Magic Box between the homes of the grandparents and the grandchildren.

Intended Purpose

The Magic Box aimed to evoke enchantment and excitement comparable to Christmas or other gift-giving celebrations.

Key point

Two-way exchange, excitement of unexpected

Theme(s)

Bidirectional, children and family, simulation

