

Experiencing Distance Wearable Engagements with Remote Relationships

Wearable technologies have long been an interest in improving human relationships as well as simplifying our tasks. The initiative to gather and reduce distances by building a wearable artifact is essential to compensate the sense of human touch and warmth. It is also very relevant to the current times especially since the Covid-19 pandemic started. There has also been a noticeable decrease and lack of human interactions. This leads to the absence of body language and often a gap in communication between two individuals. The computer mediated communication tools, such as phones, instant text messages and live video chats are generally unable to convey the same level of intimacy. Therefore, many researchers and designers has come up with solutions involving wearable artifacts, in hopes of filling the emptiness left by the remote environment people are living in as well as improving their relationships with each other. Another equally important aspect of wearable technologies – which will be tackled in the second half of this reflection, is the fact that they can become an extension of oneself. An individual could benefit and receive data which are usually inaccessible to human reach. Which could then possibly, facilitate our job and solve problems.

“Experiencing Distance: Wearable Engagements with Remote Relationships” is an article about wearable artifacts made to cover the sense of touch and warmth of human contact. The artifacts mentioned in this article are called “discussion artefacts” because they allow and invite people to talk about their sadness, as well as communicate, reflect, and carry open conversations about negative and challenging emotions. This explores people’s vulnerability, fears and emotions which are matters usually kept to themselves. In short, the first artifact “BREATH” embodies the lack of human presence of people located far apart from each other through the reduction of movement in textiles. It consists of servo motors on the back which allows light textiles to move mimicking human breath. In addition, both artifacts are connected using Wi-fi connection, and RFID sensors and tags are attached to sense if the wearers of the artifacts are hugging. The textile would move when the pair is close. In reverse, the textile will slowly stop moving and eventually stop when the individuals are far apart. “WARMTH”, the second artifact embodies the lack of human body interactions between individuals also physically distanced from each other through the reduction of body temperature. The pairs would essentially be connected through Wi-Fi as well and are able to detect each other’s proximity in the form of heat. The heat pads would warm up if the participants are close to each other and gradually decrease whenever the participants distance themselves. It then replicates the body warmth an individual would feel from another person during a hug.

There are multiple co-designed wearables for couples such as a HugShirt (CuteCircuit, 2002), ComSlipper (Chen, Forlizzi, & Jennings, 2006), and United-pulse ring (Werner, Wettach, & Hornecker, 2008). To briefly explain, the HugShirt is essentially a product in the market which claims to enable users

to send hug data to another individual or group of friends via Bluetooth to their Hug Shirt™ or via an application in real-time around the world. These tee-shirts are rechargeable through a USB-C cord, contains 12 Haptic micro-actuators, has Haptics or touch communication properties, and made of Oekotex certified textiles with no pesticides and harmful substances. They are also surprisingly completely wireless, manufactured with smart fabrics and is considered a sustainable zero-waste design¹. Comparable with the previous artifact, this product was fundamentally based on the concept of hug, a human intimate interaction to improve human relationships. It also goes the same about sharing mixed emotions with each other and exploring the vulnerability of individuals. In this case, this artifact is a profitable product on the market made by *CUTECIRCUIT* who also manufactures other wearable pieces of technology. Another article about “Exploring Wearable Technology for supporting couples in long-distance relationships”² (LDR) also discusses the different solutions offered by a group of couples. Each pair produced a wearable low-fi prototype beneficial to reducing the hardships of long-distance communication. A few examples include a wearable blanket which would essentially simulate the embrace of a distant loved one, an augmented pair of glasses that can use eye-movement to recreate visual elements only visible to the remote partner, and a headband playing the same music and sharing audio messages between distanced couples at the same time. The participants found themselves more connected with their significant other by evoking warmth, care, and intimacy through messages in four categories: enabling remote touch, expressing emotions, providing mental support, and reliving shared memories.

Wearable technologies have been proven to improve human relationships as they enable individuals to experience sensations beyond their capabilities. For instance, this wearable sensor prototype by Sam Landay for orientation and communication made for humans who travels outer space in a zero-gravity environment³. His prototype’s main function is to restore spatial awareness through the senses of touch, sight, and inner ear feedback. People would be able to convey their messages in different ways using wearable artifacts if close human interaction is not allowed or whenever there is a disability. They can also provide healthcare aid for people who do not have nearby access to medical assistance as well. There are endless combinations of wearable artifacts such as tattoos, clothes, and devices attached to accessories which could eventually help detect diseases and malfunctions in advance. In return, the feedback data will allow us to improve our current systems which are also crucial in building new forms of wearables.

¹ CuteCircuit. (2002). *HugShirt*. cutecircuit.com/the-hug-shirt/. Accessed 8 December 2019.

² Li, Hong, et al. “Exploring Wearable Technology for Supporting Couples in Long-Distance Relationships.” *DRS2020: Synergy*, 10 Aug. 2020, pp. 2083–2097., <https://doi.org/10.21606/drs.2020.205>.

³ Landay, Sam. “Wearables for Orientation, Wearables for Communication.” *Medium*, The Mechanical Artifact: Ultra Space, 6 July 2021, <https://medium.com/the-mechanical-artifact-ultra-space/wearables-for-orientation-wearables-for-communication-820f44716188>. Accessed 8 Nov. 2021.

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Our Symbiotic Life

Our society is always pushing the limits of technology and innovation, through thorough research about fiction design and storytelling. Current technologies are now able to accomplish what was considered fictional a few decades ago. It allowed us to build prototypes of interactive artifacts using human-centered computing tackling interspecies relationship between living creatures with their environment. These tools could essentially help us find solutions to many social issues such as climate change, with the use of tangible metaphors to create an impact in the future with the goal of preserving our planet.

This article gasps the issue of climate change, by helping human individuals to live in symbiosis with our environment and improve our relationship with other species in the planet. It starts by exploring prototype possibilities using fictive scenario visualization techniques to identify solutions to the “wicked” problems. It was made to find alternative permanent solutions and create a symbiotic environment which benefits human beings as well as the plants. It also discusses about speculative designs which essentially allow the users to find answers beyond the boundaries of imagination using technologies that has the potential to be developed soon. Lo-fi prototyping methods such as sketching and organizing visual elements enabled users to create stories. For instance, there is a self-driving car prototype which used “harmony” as a tangible metaphor” to explain the relationship between the shared goods, gardens and the members of a community¹. Their mobile gardens are moving ecosystems mixed with the autonomous driving systems. It also functions along with an application that sends the user a notification alerting them that some crops are ripe and ready to collect from their associated self-driving cars. Fundamentally, their intention was to bring awareness in the socioeconomic context of environmental degradation by bringing up a sustainable way to consume. This type of prototype designs allows the user to tackle many other socioeconomic issues involving our culture and the way our society functions which may not be durable in the long-term.

It has become very common for researchers to combine two entities together, whether it is to find alternative ways to make human live more conveniently in an unusual environment or to understand animals’ behavior in an unfamiliar environment. This article analyzes and demonstrates an example of a failed experiment with chimpanzees². This experience was also considered quite controversial due to the implementation of computational mechanics, wires, and the sturdiness of the materials and unexpected scenarios when the chimpanzees were exploring the artifact. However, the purpose of this investigation was to gain a better understanding of a “more-than-human environment” by testing an anthropocentric

¹ Budinger, Katja, and Frank Heidmann. “Our Symbiotic Life.” *Proceedings of the 2019 on Designing Interactive Systems Conference*, 2019, <https://doi.org/10.1145/3322276.3323698>.

² Tironi, Martín, and Pablo Hermansen. “Prototyping Coexistence: Design for Interspecies Futures.” *ARQ (Santiago)*, no. 106, 2020, pp. 38–47., <https://doi.org/10.4067/s0717-69962020000300038>.

hypothesis. In short, this experiment took place in the National Zoo of Chile in which a sound instrument designed for that environment was installed consisting of a wooden exterior with 12 buttons each producing a different sound. After four months, researchers were able to observe the evolution of the chimpanzees' relationship with the instrument and categorize it into three phases: acceptance, exploration, and naturalization. The animals later understood how to use this new interface by playing pressing many buttons simultaneously and rhythmically for occasionally up to 20 minutes. The last phase is called "naturalization" because they get used to its new appearance and familiar with its new form of use. Essentially, this demonstrates the possible coexistence scenarios of artifact design in a non-human animal living space.

Another method is the use of speculative design. For instance, there is a series of prototypes in a project created by Alan Hook called *Equine Eyes* (2019), are related to the theme of inter-species connections also discusses about anthropocentric biases. In this case, it focused on Animal-computer interaction (ACI) rather than the common human-computer interaction (HCI) based designs. It fundamentally consists of a set of "wearable and useable headsets which test approaches to fostering inter-species connections with horse"³. It simulates the horse's 180-degree vision with the use of two live cameras rendered feedback, each assembling a 360-degree immersive experience to the human user. It allows us to construct empathy and understand non-human animal behaviors, to eventually creating more inclusive artifacts for the future.

Last but not least, Matilde Beolhouwer, a dutch designer, concentrates most of her work on human's relationship with other species and the sustainable benefits it could have on humans. An example of project is "Insectology: Food for Buzz"⁴ which was created to help the declining population of bees and other insects around the world. It implements "a series of artificial ongoing flowering flowers to serve as an emergency food source for the [...] bees, bumblebees, hoverflies, butterflies and moths"⁵ and to imitate a more recognizable and approachable environment for these insects.

To conclude, there are many possibilities for co-existence and symbiosis. By continuing to produce and build prototypes with techniques such as fiction design and storytelling, I believe that we can better understand humans' as well as inter-species relationship with the planet and eventually help preserve our animals and flora.

³ Hook, Alan. "Exploring Speculative Methods." *Alphaville: Journal of Film and Screen Media*, no. 17, 2019, pp. 146–164., <https://doi.org/10.33178/alpha.17.09>.

⁴ Kaiser, Sara. "From Human-Centred to Interspecies Design." *Unbore, Unbore*, 30 June 2021, <https://www.unbore.org/stories/human-centred-to-interspecies-design>. Accessed 27 Nov. 2021.

⁵ Boelhouwer, Mathilder. "Atelier Boelhouwer – Matilde", *Atelier Boelhouwer*, www.matildeboelhouwer.com/. Accessed 1 Nov 2021.

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Hackathons as Participatory Design

Modern hackathons allow people to join and witness the design and technological process of creating prototypes. Fundamentally, hackathons are interpreted as “problem-focused programming event[s]”¹, which usually consists of programmers and designers gathered in groups to create a product using existent technologies to develop alternative ways to solve problems. The results could either improve the effectiveness of a current technological solution or explore solutions beyond existing ones in response to social issues. Hackathons can certainly be an eye-opening experience for many since the event organizers are in a position that makes it accessible to people unfamiliar with hackathons. Not only could these events be helpful in expanding our scientific knowledge, but it could open a wider range of opportunities outside the generic community which consists of people predominantly cis-gendered, white, and male.

This main article discusses about the concept of hackathons to the idea of maternal health and compares it to the concept of breastfeeding. It also discusses about the participation design aspect in many hackathon events and the importance of feminist human-computer-interaction (HCI) development. The general idea of this event was to develop a more inclusive and equitable system, which would encourage more people to join this collaborative environment regardless of whether they have different sexual orientation or if they are people of color. Inclusivity was one of the main intentions for this hackathon, which proved to be a success in this case. Since they are usually not taken into consideration during hackathons, the organizers planned this with the intention to battle against the social inequalities and oppression these individuals are facing. In short, many organized a hackathon event called “Make the Breast Pump Not Suck”, which consisted of groups with the goal of building a breastfeeding pump for mothers and find a long-term solution using participatory design approaches. The results would essentially benefit low-wage women workers unable to access paid maternity leave and other primitive opportunities. Therefore, conveying an ideal feminist world using Participatory Design methods to alleviate complex social issues.

Hackathons are events allowing designers and programmers to use their knowledge and skillset for a good cause as an attempt to solve a social issue. For instance, a hackathon occurred with the goal of improving online and real-life security of younger and older generation people. It is called “Press F1 for help”² which was organized by a group of students in Warsaw from the Polish-Japanese Academy of Information Technology. During this-24 hours long hackathon, a group of students used participatory

¹ Hope, Alexis, et al. “Hackathons as Participatory Design.” *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 2 May 2019, pp. 1–14., <https://doi.org/10.1145/3290605.3300291>.

² Balcerzak, Bartłomiej, et al. “Press F1 for help: Participatory design for dealing with on-line and real life security of older adults.” *2017 12th International Scientific and Technical Conference on Computer Sciences and Information Technologies (CSIT)*. Vol. 1. IEEE, 2017.

design methods and chose to cover the case concerning “intergenerational communication”. They developed more secure social interaction features within certain applications with the aging population in mind. They also needed to consider that trust is an important factor when building their application. Due to their limited experiences, it is known that adults tend not to use information and communication devices because of the risks it carries. Many members of the group encountered some difficulty during the designing phase in relation to the platform’s accessibility and the seniors noticed that there was a lack of knowledge in that domain. To overcome the obstacle, they used yet again participatory design methods and exchanged messages to redirect the project into a more user-center based platform. It also significantly improved the intergenerational relationship within the team. In addition, both adults and younger people were able to voice their concerns in terms of online risks to avoid when using the platform such as fake or malicious users.

There is another approach in relation to participatory design to solve issues regarding urban development. Many citizens find themselves waiting a long time to own real estate developments due to “ineffective [...] solutions and city government’s inability to efficiently communicate with stakeholders”³. Therefore, people gather in urban hackathons with the goal of developing a sustainable urban environment “increasing the active role of citizens”. Besides, hackathons centralizing on building sustainable real estate are also called Green Hackathon. Fundamentally, the origin of urban hackathon is extracted from the larger term of civic hackathons. Civic hackathons had a longer tradition historically and usually involves the participation of people in many fields such as IT specialist to communicators, community organizers and other specialists and activists. It encourages participants to cooperate by sharing knowledge and using the power of information. Instead of putting their effort into pure coding, the community focuses on building strong foundations with open data, by producing proposals and document drafts with convincing arguments predicting strategies to employ in the future. This type of hackathons is contributing significantly to the rise of popularity in Smart Cities which incorporate more technological advances in their infrastructure.

Furthermore, the concept of participatory design is highly viewed upon during hackathons as they are commonly used for recruiters to recruit new talents or find inspiration for their businesses. These events are held for educational purposes, in addition to exploring the creative combinations and understand the extend of possibilities when building a prototype as well as co-designing as a team to overcome obstacles within a limited period. In return, organizers can leverage information and resources to generate move hackathon events and curate more inclusive environment with participatory design and cooperation.

³ Pogačar, Kaja, and Andrej Žižek. “Urban Hackathon – Alternative Information Based and Participatory Approach to Urban Development.” *Procedia Engineering*, vol. 161, 2016, pp. 1971–1976., <https://doi.org/10.1016/j.proeng.2016.08.788>.

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