

MAS 350H Independent Study: Project Us

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28 May 2021

1. Literature Review

As communication technology continues to revolutionize human connection through social media platforms, instant messaging services, and video telephone applications such as FaceTime and Zoom, we must question how these technologies affect sociability and whether it enables a deeper understanding of people's thoughts and feelings.¹ While online technology enhances sociability when deep offline engagements exist or are otherwise difficult to obtain, it hinders sociability when online engagements replace deeper offline engagements.²

According to Manney, we live in a time of increased global connectivity but disproportionately decreasing levels of empathy.³ Being able to empathize makes us feel more connected; therefore, it is critical for deepening the relationships we forge through a computer interface.⁴ Fortunately, empathy is a teachable, learnable skill that people can acquire and condition over time.⁵ Technologically enabled solutions exist; however, they are expensive and not easily deployable beyond a clinical setting.⁶ Project Us identifies these shortcomings and introduces an empathy-enhancing wearable device that can help facilitate difficult conversations between people on a casual basis. The hope is that the device will trigger a potential learning effect if people use the device over a long period.⁷

2. Project Us Overview

¹ Adam Waytz, Kurt Gray, "Does Online Technology Make Us More or Less Sociable? A Preliminary Review and Call for Research" *Perspectives on Psychological Science* 13, Issue no. 4 (2018): 473, <https://doi.org/10.1177/1745691617746509>.

² Waytz, Gray, "Does Online Technology Make Us More or Less Sociable?" 473.

³ Manney, PJ, "Empathy in the Time of Technology: How Storytelling Is the Key to Empathy." *Journal of Evolution and Technology* 19 no. 1 (September 2008): 51, <https://storynet.org/empathy-in-the-time-of-technology-how-storytelling-is-the-key-to-empathy/>.

⁴ Camilo Rojas et al., "Project Us," Companion Publication of the 2020 ACM Designing Interactive Systems Conference, March 2020, <https://doi.org/10.1145/3393914.3395882>.

⁵ Max T. Curran et al., "Understanding Digitally-Mediated Empathy," *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, February 2019: 2, <https://doi.org/10.1145/3290605.3300844>.

⁶ Rojas et al., "Project Us," under "Introduction."

⁷ Rojas et al., "Project Us," under "Conclusions & Future Work."

As we describe on the project website, Project Us seeks to help people practice empathy by leveraging the power of machine learning (ML) and wearable devices. "Us" is a wearable textile device that can sense the wearer's biosignals and seamlessly convey them to their interlocutor during any interaction. We are especially interested in using this technology to facilitate positive interactions between people engaged in controversial discussions such as gun laws or abortion. This technologically-enhanced feedback loop aims to enable each partner to "feel" the other's emotions and corroborate it with context data in a way that could result in a gradual training of their ability to empathize with others.

3. Introduction

From June to December 2020, I joined the Fluid Interfaces group at MIT's Media Lab to work on Project Us with an interdisciplinary team of other MIT and Wellesley undergraduate researchers. Before joining, my project advisors Camilo Rojas and Gaurav Patekar prototyped "Us," a wearable device (wristbands) to induce empathy between users. Due to the uncertainty of the pandemic, the project evolved and adapted to the limitations of remote collaboration and social distancing, culminating in a portfolio of an in-person and web interface experience. As a member of the design workstream, I was responsible for delivering "Us" to users through an art installation, a web interface, and a website. The following documentation overviews an iterative process and ongoing timeline progressed by innovative research and experimentation.

4. Art Demo

During summer 2020, we submitted a proposal to an open call at the Science Gallery Melbourne who commissioned us to design an interactive art demo featuring "Us" for the MENTAL exhibition, which opened in early 2021. My task was to transform "Us" into an art demo for museum-goers to experience, which involved designing the physical installation, user experience flow, graphic wall labels, and memento. Our timeline consisted of an exhibition at MIT's Media Lab and a show at a commercial gallery in Boston before bringing the demo experience to Melbourne, Australia, as part of MENTAL. Unfortunately, due to the circumstances of Covid-19, we decided to push the installation opening to a later date.

The steps to create an interactive art demo consisted of multiple design stages. Below I present a few: the preliminary designs for user interaction, installation design, and 3D modeling with supporting images.

4.1 User Interaction: Preliminary Designs

The preliminary design stage consisted of quick sketches on paper, which I transferred to Illustrator. Figure 1 illustrates the main features needed in the art demo: the hardware, projectors, bracelets, seating for users, and a screen interface that prompted users to choose from a list of topic suggestions such as human rights to healthcare and gun laws. Subsequently, I created a more detailed illustration of the art demo in Photoshop, as shown in Figure 2. We used these images to supplement our proposal and accompany design explanations.

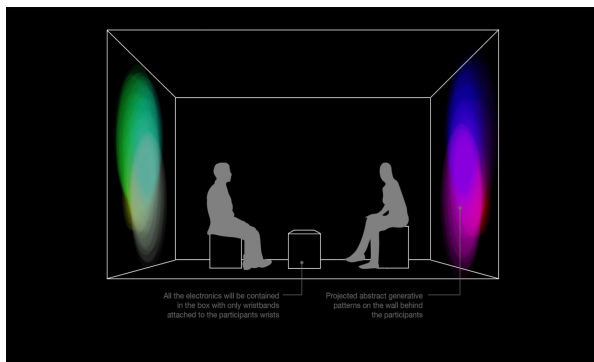


Figure 1. Installation basics including a box containing electronics. While hooked up to the bracelets, abstract generative patterns project onto the wall behind participants

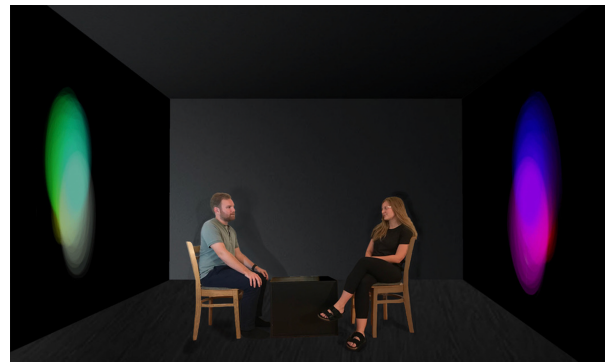


Figure 2. A realistic image of how the installation might look when users are in the space

4.2 Installation Design

I first approached designing the art installation with brief sketches that mapped the goals from the ideation phase, which emphasized ease of use, Covid-friendly guidelines, and user confidentiality. I then constructed the design in Sketch. The first iteration prioritized user privacy (see figure 3), which I substituted for a more Covid-friendly, more inclusive design in the next iteration (see figure 4).

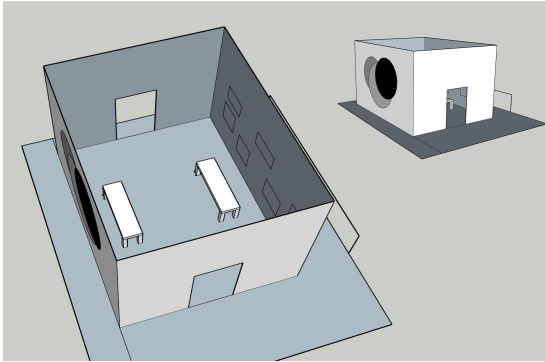


Figure 3. Sketch model of a preliminary design. Box-like structure allows users to have private conversations. Generative patterns projections on the interior and exterior to engage non-users.

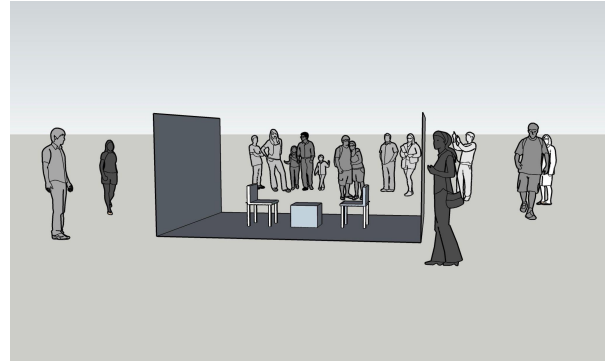


Figure 4. Sketch model of the final design. Engages non-users in the art demo through open walls. Activates a Covid-friendly space. Generative patterns project on the walls behind users.

4.3 3D modeling

As Covid-19 escalated, my advisors redirected the project to involve users virtually instead of in person. While the developers on my team programmed the application that would relay users' emotional states to one another, I created a virtual environment that would host the application and immerse the users in the art installation (see figure 5). Creating a virtual involves using Matterport, a 3D space capture, which allows you to scan an environment and render it in modeling software. After collecting the texture and shapefiles of the Media Lab, I imported them into Unity, along with the Sketch model of the art demo (see figure 6). The purpose of this model is to replace the in person demo with a virtual equivalent that users will experience as they use the web interface.

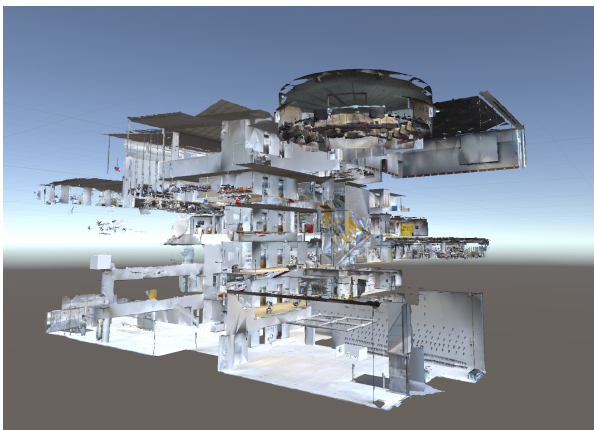
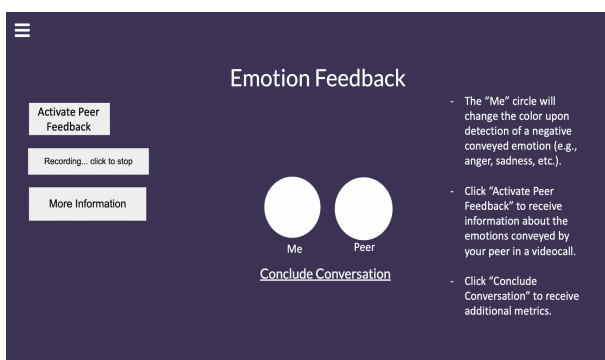


Figure 5. 3D model of the Media Lab rendered in Unity**Figure 6.** 3D model of the art demo in the Media Lab model. Sprite animation projections on the walls behind users

5. Web Interface

The current state of Project Us consists of two modules that operate either separately or jointly: the wearable bracelets and a virtual interface (Us.virtual). Us.virtual can run during any virtual interaction (e.g., Zoom), extract the emotional valence from the conversation (speech, tone, heart rate, and facial expressions), and discretely feed it back through an on-screen display. While my coworkers programmed the application, I helped design the interface that would relay the emotional feedback between users, as shown in Figures 7 and 8. Though the emotional feedback is relatively simple, it was still effective in user testing. Our results indicated that users experienced an increased level of attention and awareness of self and others for both of these modules used separately.⁸

**Figure 7.** Web interface displaying emotion feedback. The “Me” circle will change color upon detection of a negative emotion conveyed. “Activate Peer Feedback” button allows users to receive information about the emotions conveyed by their peer. Credit: Julie Lely**Figure 8.** Users employing Us.virtual on a Zoom call

6. Web development

⁸ Camilo Rojas, “Project Overview ' Project Us,” MIT Media Lab, accessed May 28, 2021, <https://www.media.mit.edu/projects/project-us/overview/>.

As a side project, I designed a logo and other graphic elements to accompany the project website as illustrated in Figure 9. The logo design references the generative data visualizations my coworker created that would project on the walls behind the users. Figure 10 depicts a still image of the data visualization that outputs colorfully morphing shapes and opacities in real-time based on users electrodermal activity (EDA).



Figure 9. Project Us logo

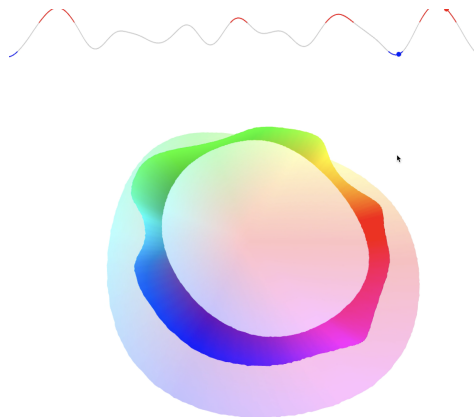


Figure 10. A still image of the generative data visualization that changes in real-time based on the EDA input data from users. Credit: Gaurav Patekar

7. Reflection

As a Media Arts and Sciences major and an aspiring UX/UI designer, I have long wanted to collaborate on a project that fuses art, technology, and humans. Fortunately, Project Us presented me with the opportunity to apply my skills from computer science and studio art courses at Wellesley to a tangible research project. Furthermore, my fascination with "Us" and the paradox of empathy and technology, alongside my eagerness to devise an interactive demo and work with real users, fueled my interest in the project. While I hoped to use my background in user experience design, web development, and modeling software to push the project along, I joined knowing I would learn new software tools and programs to enhance my skill set.

Besides wanting to gain experience in a professional workplace, the project seemed especially pertinent to the social and racial problems set amid the growing Covid-19 crisis. In the wake of George Floyd's death, the civil unrest that followed, and the increasing hatred and bias

against Asian Americans, I considered this a contributory project to the technological solutions toward a more profound sense of connection and mutual respect between Americans. In addition to safely facilitating human-to-human interaction, this project engaged people in constructive conversations around racially and politically charged topics such as human rights to healthcare and gun laws. Having witnessed users change their actions in response to their awareness of others' feelings is evidence that we can become increasingly empathetic with technology-aided practice.

8. Bibliography

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