Artist Statement

The Dysphoria Mirror is an interactive art installation to showcase some of the multiple types of dysphoria experienced by trans and queer individuals. Focusing on the experience: physical and biochemical dysphoria.

Dysphoria is defined as a “state of unease or generalized dissatisfaction with life. The opposite of euphoria” (Gender Dysphoria Bible “A Brief History of Dysphoria”). In trans individuals this dysphoria, typical in the form of gender dysphoria, manifests as a result of a misalignment of the internalized sense self and externalized manifestations. While the most common form of dysphoria discussed is physical, these external manifestations can result in many different categories and forms of dysphoria within individuals. For example social dysphoria is the disconnect between the internal social sense of self and the external pressures of self placed upon others, and manifest in an uncomfortableness around the pronouns used to describe an individual. Another example of dysphoria is the cultural dysphoria, where the cultural practices an individual interacts with do not align with their internalized sense of self. An example of this form of dysphoria can be seen in the American use of a bathing suit. Girls and women, in American society, have their breasts covered while wearing a bathing suit, for a trans woman they might experience cultural dysphoria at the aspect of having to wear only mens swim trunks leaving their chest exposed. The misalignment of cultural expectations of clothing causes unease in the individual simply by wearing or existing in a space where this cultural expectation manifests.

While physical dysphoria might be the most commonly discussed form of dysphoria, biochemical dysphoria is not. This form of dysphoria results in an imbalance in the biochemical nature of an individual's brain due to the disconnect of self and external manifestations. The symptoms of biochemical dysphoria can mirror those of long term trauma experience such as depersonalization, derealization, and dissociation. These conditions can occur naturally as an individual's unique manifestation of dysphoria or can occur as a result of years of dysphoria altering the biochemical make-up of the individual's brain.

The Dysphoria Mirror project, focusing on physical and biochemical dysphoria, attempts to show how these forms of dysphoria manifest as well as how a case of physical dysphoria can lead to the creation of a co-morbid experience of biochemical dysphoria.

Interaction Design

The design of the interactions for the Dysphoria Mirror focus on two design principles: Lyrical Metaphors of Science Fiction and the difference between looking “through” vs “at” a mirror.

The first part of the design, the lyrical metaphors, comes from the writing in *The Jewel-Hinged Jaw* (Delaney, 1977) and more recently *Do Metaphor’s Dream of Literal Sleep* (Chu 2010), on how the design method of

science fiction is the process of creating experiences that are multiplayer containing both literal and metaphorical aspects at the same time. Through this process, Chu explains that the unreal can become real to individuals who cannot fathom or experience these worlds. Specifically in the dysphoria mirror, this design technique helps bridge the “unreality” of the trans experience to the “reality” of a cis individual's experience.

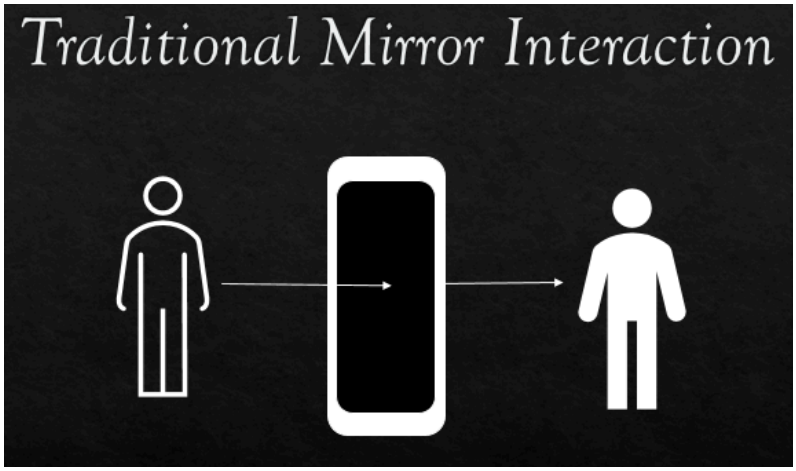

Figure 1: Traditional Mirror Interaction

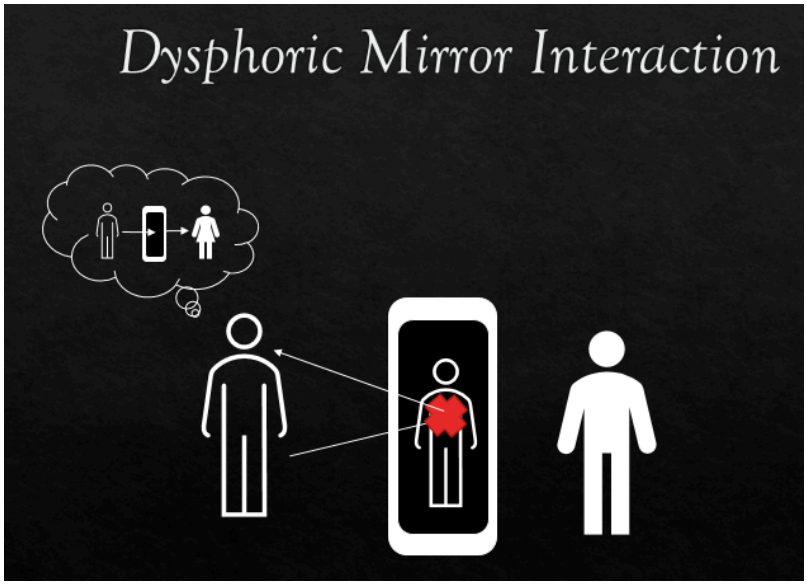

Figure 2: Dysphoric Mirror Interaction

This bridging is done through the different uses of a mirror by cis and trans individuals. In a traditional use of a mirror the individual looks through a mirror at themselves. The reflection of the screen being a “pool” where they see themselves contained within. In an individual with dysphoria this “pool” becomes a barrier that disrupts the act of seeing themselves. In this case the dysphoria comes from the mirror reflecting the physical disconnect between mental self and actual physical self.

Using this difference between mirror as a pool vs screen the interactions for the project become focused on the creation of an interactive mirror screen where participants would have to physically touch the screen in a search for the cause for an optical illusion placed between themselves and their reflections. The traditional use of a mirror as a pool to look through would be interrupted by an object or image, transforming the pool into a screen. This screen would then allow for interactors to attempt to locate the source of the interruption touching it, remove the blockage and return to mirror to its original usage.

However, this metaphor of interaction can be extended to include the experience of biochemical dysphoria. The experiences of depersonalization, derealization, and dissociations are a disconnect from reality in a specific form: depersonalization is self-focused condition manifesting as a disconnect of the individual self from the reality of the world; derealization is reality focused condition resulting in a disconnect of the reality of the situation from the individual self; and dissociation can be viewed as a combination of both depersonalization and derealization resulting in a disconnect between both the individual's sense of self and the reality of their lived situation.

For the sake of the design of the Dysphoria Mirror, should the experience of locating the source of the interference take too long, either due to the challenge of location or the experience overwhelming participants, the experience shifts to showcase a metaphorical view of how an individual with biochemical dysphoria might view the world through the adoption of the blockage as an aspect of reality. The three concepts below showcase the three selected forms of dysphoria for this project.

Figure 3: Non-Dysphoric Mirror Concept

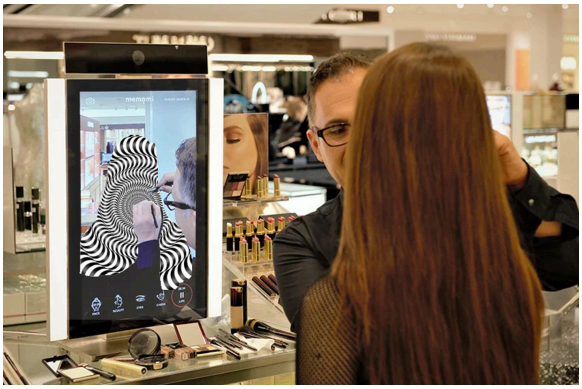

Figure 4: Depersonalization Concept

To mirror the feeling of depersonalization in the interactor the program running the mirror switches to superimpose the optical illusion over the physical form of the interactor (Figure 1 above). This mirrors the way in which this form of dysphoria can cause an individual to define their individual sense of self by their dysphoria and distance themselves from the body, while remaining connected with the reality of their life.

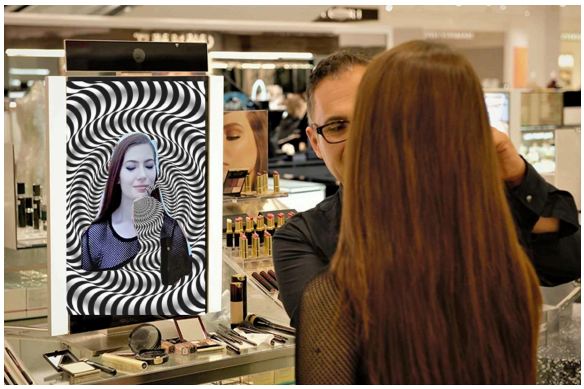

Figure 5: Derealization Concept

For derealization, instead of the individual being replaced with the optical illusion, everything but the interactor is replaced (Figure 2 above). The interactor will be able to see themselves in the reflection, but the world around them is distorted. This mirrors the experience of becoming so accustomed to seeing through the illusion of dysphoria it becomes a lens imprinting itself on the individual views of the world altering their perception of reality.

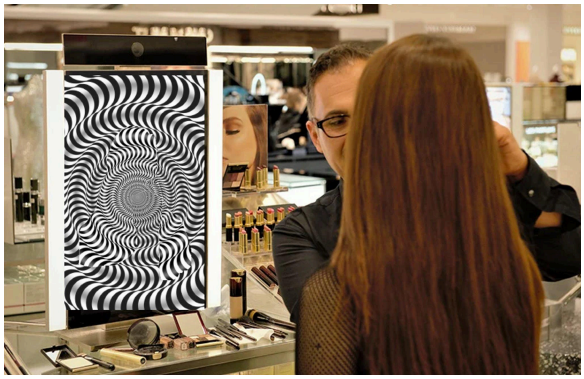

Figure 6: Dissociation Concept

Formally, to attempt to create the metaphorical feeling of dissociation the experience will combine the previous two conditions by having the background of the individual is one version of the optical illusion and the individual themselves replaced with another version of the same optical illusion. In this situation, the individual comes to see themselves as the blockage in depersonalization, but also has become so accustomed to the blockage that it becomes a lens to view the world which distorts the lived reality of their experience.

Design Technologies

The design of the Dysphoria Mirror draws on the work of several artist including Daniel Rozin's "Fur," Yayoi Kusama's Phalli's "Field," Levi Taylor Brooker's "Dysphoria" and Alesia Fisher's "Dissociation."(Image 1-4 below) These works inspired the desire to create mental health art pieces using mirrors that were interactive and relevant to the mental health spaces. While the concept of mirrors and what defines a mirror (in the case of "Fur") are an aspect of art, how they tie to mental health and their ability to provide participants with interaction was not so robust. As such this project, using these pieces as inspirations I turned to the research on touch screens and "smart mirrors" to begin designing the project.

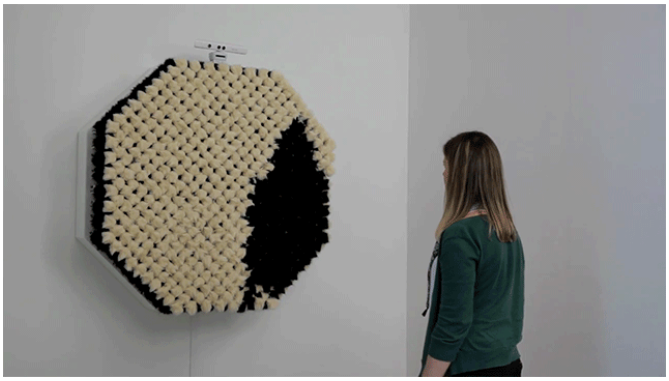

Image 1: Daniel Rozin's "Fur"

Image 2: Yayoi Kusama's Phalli's "Field"

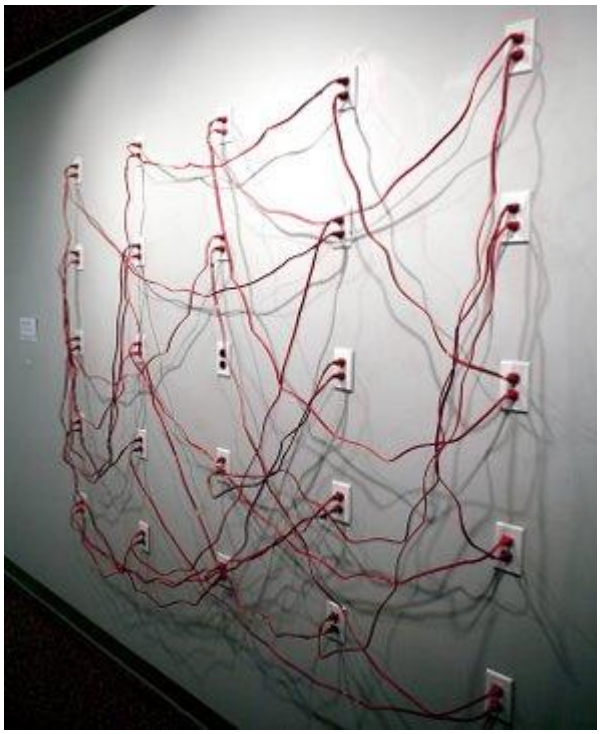

Image 3: Levi Taylor Brooker's "Dysphoria"

Image 4: Alesia Fisher's "Dissociation.

Smart Mirrors

A smart mirror is a computational display that uses a mirrored surface to provide the user with feedback or information on pertinent information. For this project the designs of Becky Stern were used as a blueprint (Raspberry Pi Smart Mirror - Becky Stern). Stern's design was centered around the use of the mirror in her bathroom, it was to be used while she prepared for her day and provide important details such as weather or traffic. The design utilized a custom built housing to contain both the raspberry pi microcomputer, the computer monitor, and a two way mirror.

The pricing for this was outside the budget for this project so a simpler solution was created. INstead of a frame and mirror a two-way mirror film would be placed over the front of a computer monitor. This "mirror" would be connected to an external device via a HDMI cable for ease of transportation.

Touch Screens:

Having previous experience building an interactive touch screen for GT Adam Lab's Tune Table project (2016, image below), I know the process by which to build and look for how to turn a surface into a touch screen. For the tune table a service of LED lights were housed within a rectangular frame to create an IR field. This field was covered in a sheet of vellum so that when an object was placed on or a participant touched the vellum a camera below would register the information; x,y location for touch and fiducial markers for specialized objects.

Image 5 - Adam Lab Tune Table Prototype

Since this project was created the capabilities of buying a touch screen adapter for a computer or surface have greatly expanded. In order to have to create the touch sensor from scratch, a pre-built one was bought and used for this project.

Combining Aspects

Combining the design of Smart Mirror with the Touch Sensor results in a potential “touch mirror” necessary for the metaphor of finding and dealing with dysphoria in the mirror. The next step was to build the project.

Building the Mirror

The building of the Mirror was fairly simple if physically exhausting. Below is a list of steps to create the mirror with pictures of relevant steps. But first a list of Material need to build the exhibit:

List of Goods

- Monitor in Portrait Orientation - In this demo this was accomplished via a 56” Samsong TV
- Two-Way Mirror Film
- A Web Camera
- A IR Frame
- Computer to run the Processing Sketch (P5.js) from a local server.
- (Not necessary but used in Demo) A second monitor for when the installation encounters issues

Preparing the Monitor

To mimic a full-length mirror a surplus 56” Samsung TV was donated by the LMC Technical Support for this project. This TV arrived in a landscape orientation and needed to be adjusted to a portrait orientation. This

process took several hours as the mechanism holding the TV to its stand required several different socket sets to disengage the mirror. The lengthy time required was also due to both the lack of support for the TV once it was removed from the stand and the difficulties of moving the height adjustments to lower the TV to a proper Mirror length from the ground (about 1 foot). A series of images of the process are below in the “Rotating the TV” subsection of the Constructing the Mirror Image portion of this document.

When this process was completed and firmly secured, a two-way mirror film was attached to the front of the monitor with electrical tape. In a more robust, installed version of this project an actual mirror would be placed and framed on top of this monitor or through the use of adhesives the film would be attached more permanently, but for the sake of the working demo an easy method of attachment and removal was chosen.

When the film is firmly secured and at tension across the front of the monitor the IR frame is placed on top of the mirror and held in place with electrical tape. Again, like with the mirror film, in a more robust, installed version a more permanent solution would place the frame to the monitor. But for the sake of the demo easy removal and attachment took priority. As with the Rotation of the TV in the Constructing the Mirror Images section of this document is a series of images on how the IR frame was secured to the TV all found in the “Securing the Frame” subsection.

Finally a small webcam was placed atop the monitor to activate when the biochemical dysphoria part of the experience began.

Coding

The coding for the mirror involved two very different projects: 1) an optical illusion which updates and moves via touching interaction with the and 2) Webcam Image location and tracking that replaces various aspects of the individual with the previously established optical illusion. Both were accomplished with various means with the later project relying on outside assistance from a youtube tutorial and an online database. But for ease of readability these two projects will be subdivided below .

Touch Mirror Code

Using an optical illusion image (Image 6 below), I have the program open on a blank screen. This would provide a vision most similar to a traditional mirror and provide a more start contract when the illusion appears. From the blank screen, the program checks if a mouse is clicked within the frame. At that point it draws the optional illusion and randomly creates a black circle with a white outline of someone within the optical illusion field (Image 7 below; dot highlighted yellow).

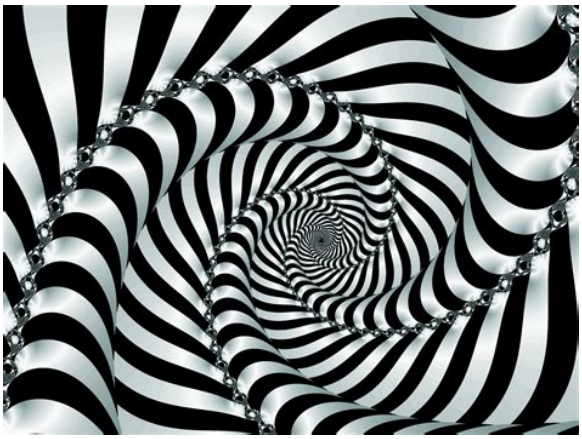

Image 6: Optical Illusion

Image 7: Optional Illusion w/ Interaction Point Highlighted

From here, the interactors must find and touch the dot. This updates the program and moves the dot to a new portion of the optical illusion. To accomplish this, there is a buffer to check if the mouse click (or in this case the interactors touch on the screen) is within a general area of the dot. If they are not, nothing happens, if the image is updated as previously mentioned. Image below shows the effective area of touch/mouse click.

This process repeats infinitely. Until the host of the installation changes over to the Image Tracking code.

Image Tracking Code

This code was adapted from Jeff Thompsons 2021 video
CP2: Object Detection – Webcam Tracking in p5.js/TensorFlow . This code takes the feed from an attached webcam and through the TensorFlow javascript program and database returns a computational derived assumption of an object in the camera. This code database was edited in the program to only return what it defined as “person” to help decrease any noise in the experience for the users. After that program output was adapted based on what the various biochemical dysphoria manifestations:

1) Depersonalization replaced what the program recognized as a “person” with said optical illusion, and forced the images of the person to update and move with the optical illusion in place of their human form.
2) Derealization reversed this. In this the entire background of the experience was made into an optical illusion and what the program identified as an interactor was revealed in human form.
3) Dissociation combined the previous two, making the background of the experience the optical illusion and also replaced what it identified as a persona as an color-inverted version of said optical illusion.

Future Works

In the future I hope to update this project with an actual two way mirror frame taking Becky Stern’s original design. Additionally I wish to include a different program language and camera system to better isolate the individual using the experience and better map the optical illusions to the space in the camera. This can be done with either: 1) Kinect Azure camera system and the Unity engine or 2) a projection mapping software. However the result of this would be a need to completely change the programming language from its base Processing Javascript to the base languages of those two engines.

Bibliography

Delany, Samuel R. "The jewel-hinged jaw: Essays on science fiction." *New York: Berkley* (1977).

Chu, Seo-Young. *Do metaphors dream of literal sleep?: A science-fictional theory of representation*. Harvard University Press, 2010.

https://genderdysphoria.fyi/en/history

https://beckystern.com/2022/03/06/raspberry-pi-smart-magic-mirror/

https://www.youtube.com/watch?v=WPOY2IEqUMg

Construction Images

Rotating the TV

The following Series of Image is the process by which the original Landscape orientation of the TV was converted into a Portrait orientation.

Image 8 and 9 below show the initial orientation of the Television.

Image 8: Original Frame Connections

Image 9: Original Frame Connections 2

Image 10 and 11 show the tool sets used to disassemble the Television

Image 10: Tool Set

Image 11: Key tools removed from housing.

Images 12 through 18 show the TV in various stages of disassembly

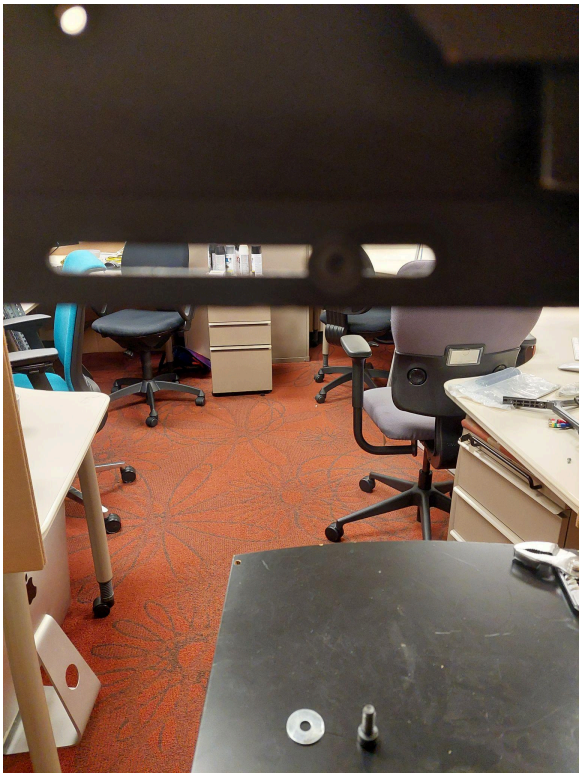

Image 12: Hex screw original positioning

Image 13: Pressure plate where the television is secured

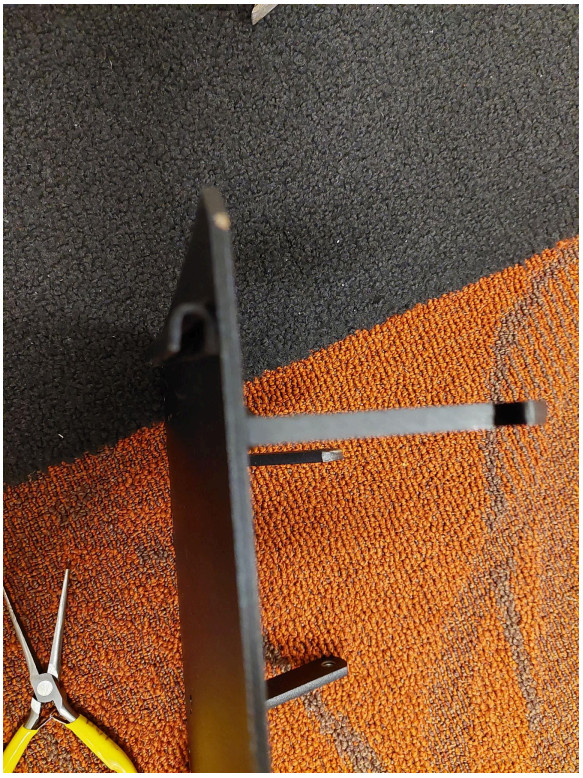

Image 14: Side view of hanging frame securing pressure plate to stand

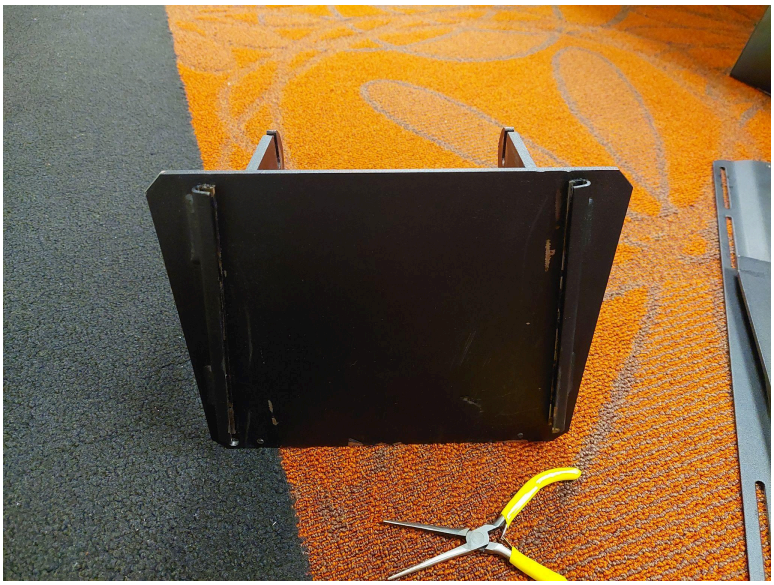

Image 15: Front view of hanging frame securing pressure plate to stand

Image 16: Side View of stand showing original and new bolt locations.

Image 17: Close up view of stand original hex bolt orientation

Image 18: Television back disconnected from frame and rotated to new orientation

Image 19 and 20 show the final completed rotation of the television

Images 19: Front Image of the finished television

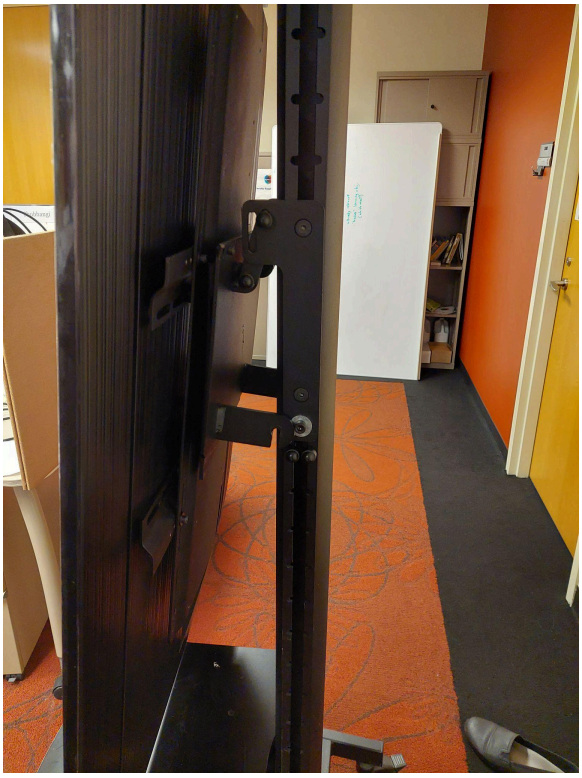

Image 20: Side Image of finished television

Placing the IR Frame and Film

The following images are the final process for how the IR frame and the Mirror film were secured to the TV.

Image 21-23 show the locations where electrical tape was applied to the IR Frame

Image 21: Side view of electrical tape used to secure IR frame

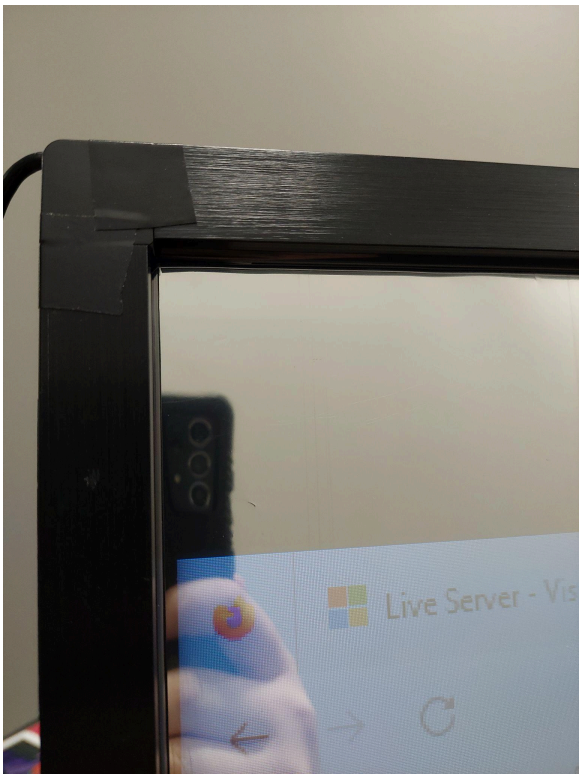

Image 22: Side view of electrical tape used to secure IR frame.

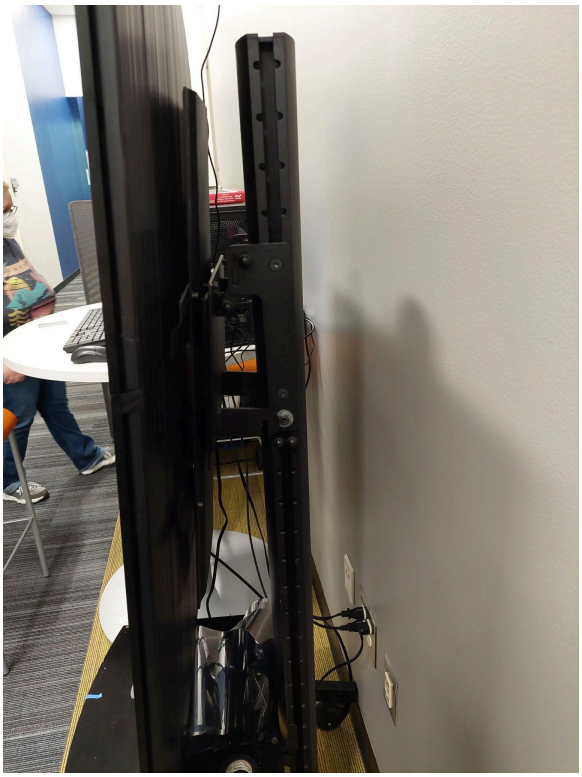

Image 23: Side view of finished frame with secured IR frame.

Images 24 through 25 show the final constructed frame.

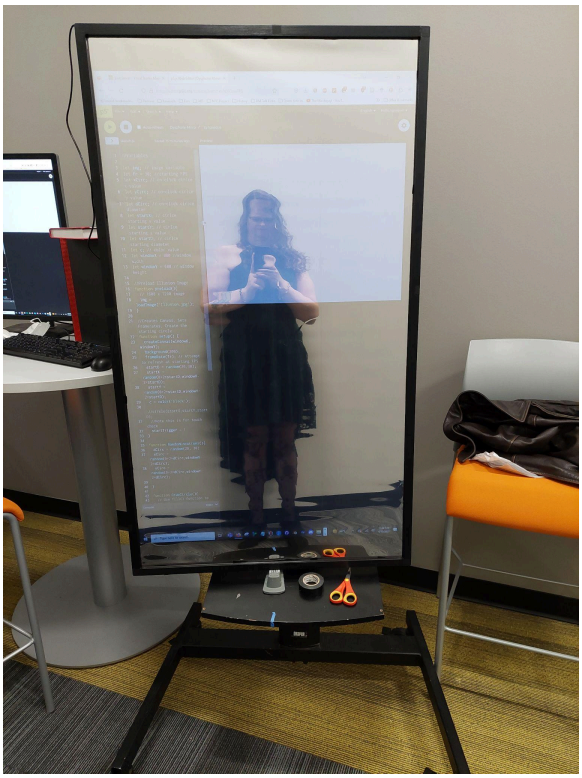

Image 24: Front view of Finished Dysphoria Mirror after construction

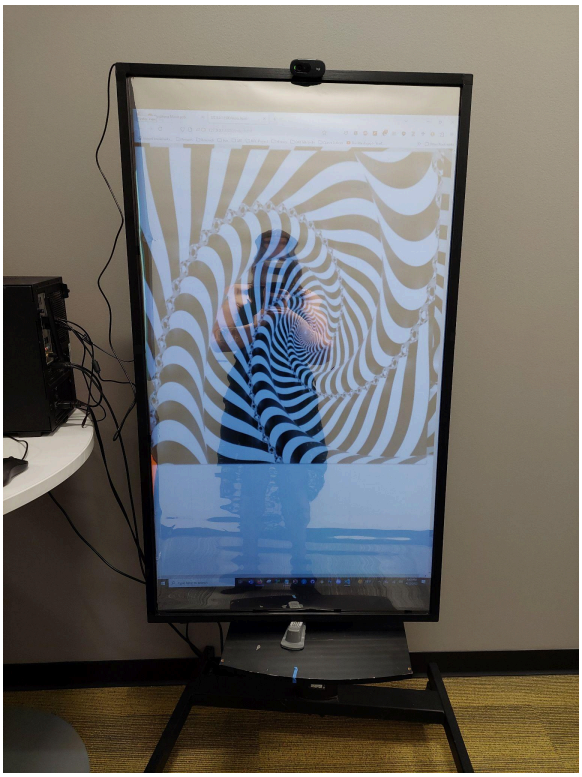

Image 25: Front view of Finished Dysphoria Mirror running the project coding