

# The Wall

Individual Art Class Project

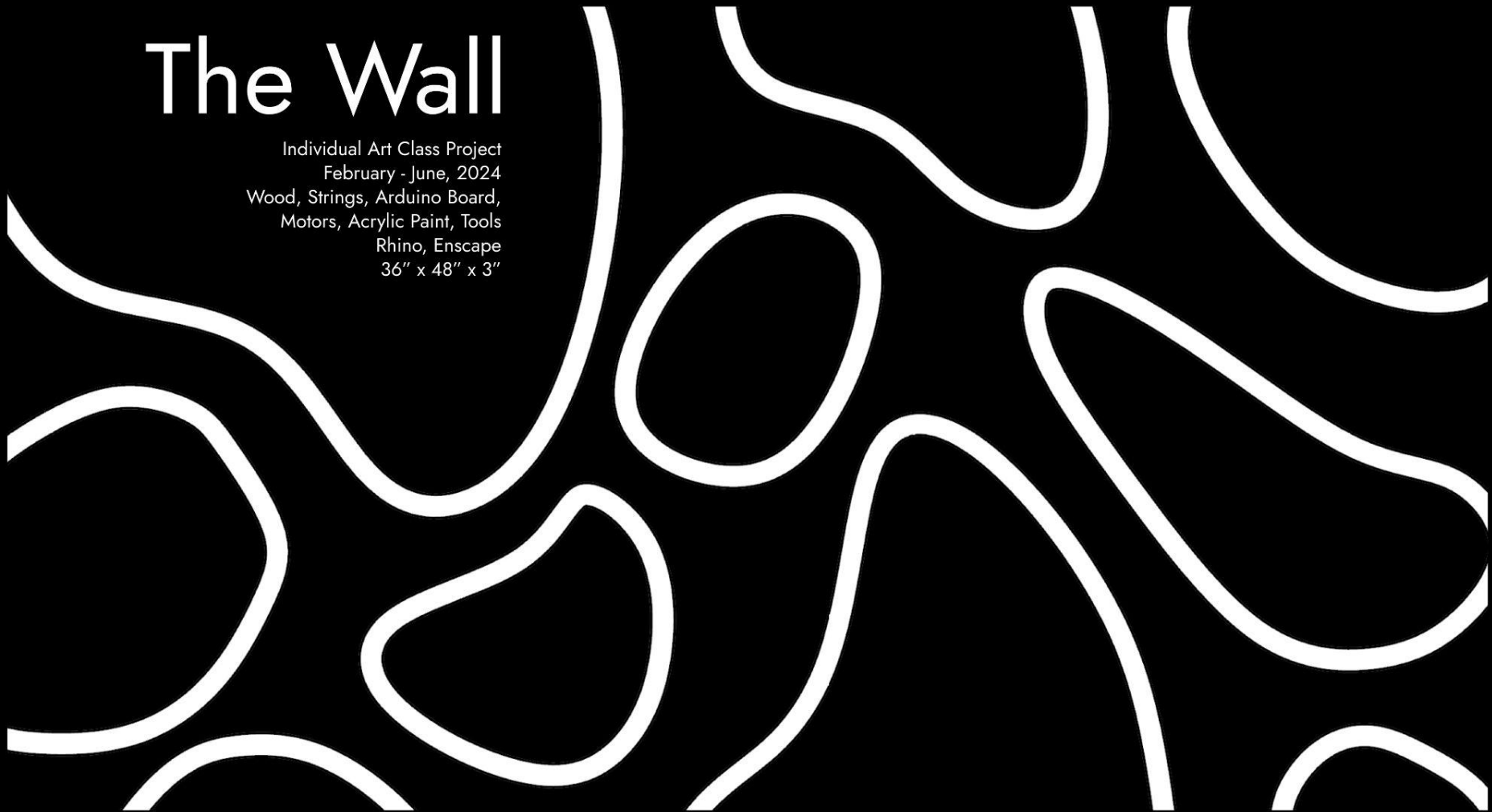
February - June, 2024

Wood, Strings, Arduino Board,

Motors, Acrylic Paint, Tools

Rhino, Enscape

36" x 48" x 3"



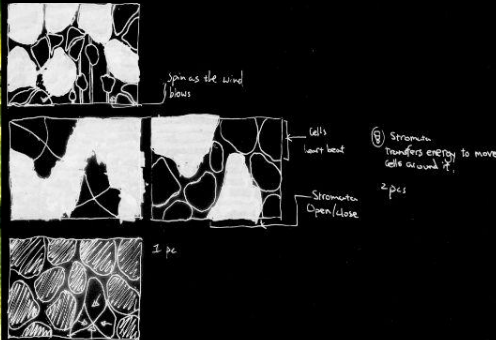
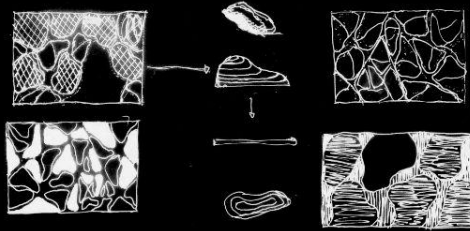
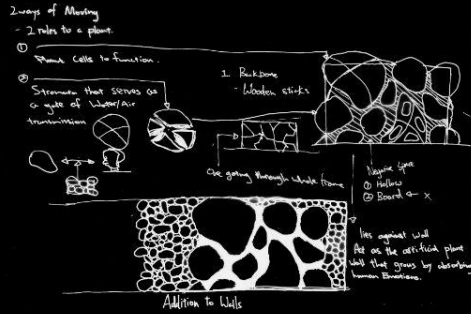
# Concept

Nowadays, the development of technology encouraged more human communications without physical interactions, making face to face conversations harder and more precious. In an effort to improve in person communications and social engagements, I created this structure that functions as an extension to walls.

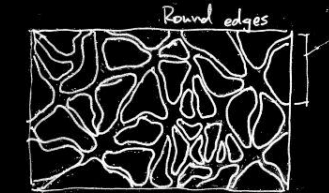


## Stomata

Acts as the mouth of plants, A stoma can be influenced by many factors, such as the time of the day, humidity, and temperature of its surrounding.



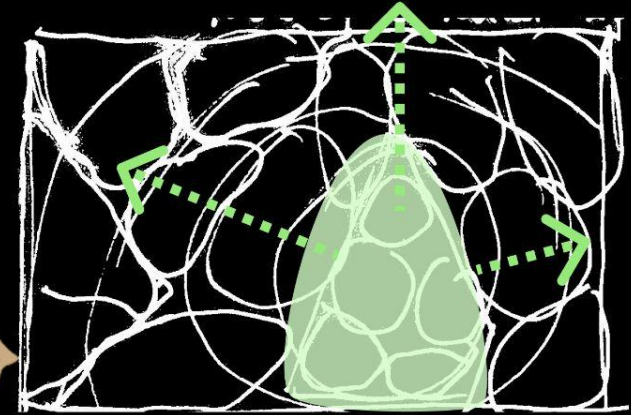
Just like plants, human can also be easily affected by those around them. Instead of by people, I proposed to find out whether plants' actions of "breathing" can also affect people.



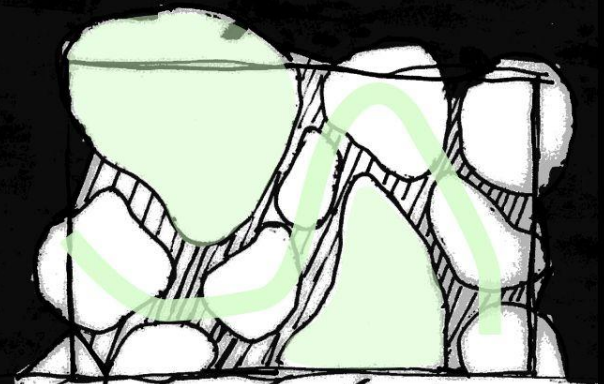
## An Organic Shape

Asymmetrical forms that reveal the fluidity and irregularity of the beautiful natural world.

## Ideas



Rhythm created by patterns spreading from a center, imitating a plant growing.



Two centers that attract their surroundings instead of spreading out.

# Movement

## Circuiting

**Power Source** 12v input for motor  
5v input for Arduino and Motor Driver

**Camera** Captures faces

**Code** Identifies emotions

**Arduino** Sends signals to move motors

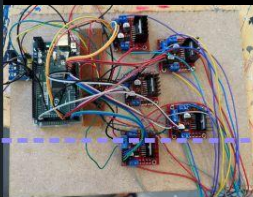
**Motor Driver** Controls Direction/Speed

**Motor** Spins the spools to open/close the nets

**Wall** Opens in response to people

```
int direction1[] = {0, 90, 180, 270, 360, 0, 90, 180, 270, 360};
int speed1[] = {0, 5, 10, 15, 20, 0, 5, 10, 15, 20};
int open_time1[] = {0};
int weighted_speed1[] = {0};
int n = 0;
int motor_sen = 0;
int motor_spe = 0;

void setup() {
  // put your setup code here, to run once:
  for (int i = 0; i < 10; i++) {
    pinMode(direction1[i], OUTPUT);
    pinMode(speed1[i], OUTPUT);
  }
  for (int i = 0; i < 10; i++) {
    weighted_speed1[i] = (open_time1[i]/5000) * 120;
  }
  //different phases
  // put your main code here, to run repeatedly:
  for (int i = 0; i < 10; i++) {
    for (int j = 0; j < 10; j++) {
      int lengthconvert = map(lengthconvert[i], 0, 1000, 0, 10);
      int length = (lengthconvert[i]*j)/10;
      if (length < 0) {
        //random led to 0
        digitalWrite(direction1[i], 0);
      } else if (length < 10) {
        digitalWrite(direction1[i], 1);
      } else if (length < 20) {
        digitalWrite(direction1[i], 0);
      } else if (length < 30) {
        digitalWrite(direction1[i], 1);
      } else if (length < 40) {
        digitalWrite(direction1[i], 0);
      } else if (length < 50) {
        digitalWrite(direction1[i], 1);
      } else if (length < 60) {
        digitalWrite(direction1[i], 0);
      } else if (length < 70) {
        digitalWrite(direction1[i], 1);
      } else if (length < 80) {
        digitalWrite(direction1[i], 0);
      } else if (length < 90) {
        digitalWrite(direction1[i], 1);
      } else if (length < 100) {
        digitalWrite(direction1[i], 0);
      }
    }
  }
}
```



## Framing



Experimenting with **elasticity** of strings



Cutting out **frames** from plywood with jigsaw



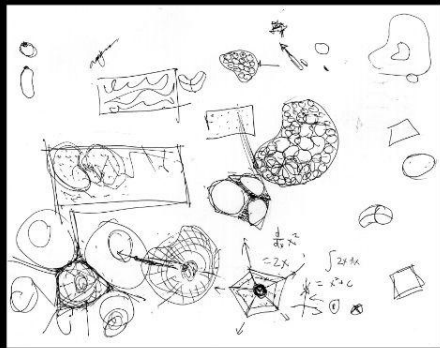
**Criss Cross** around the edge with thick elastic strings. Too much tension



**Crochet** using slip knots around the edge and an inner circle. Too empty.



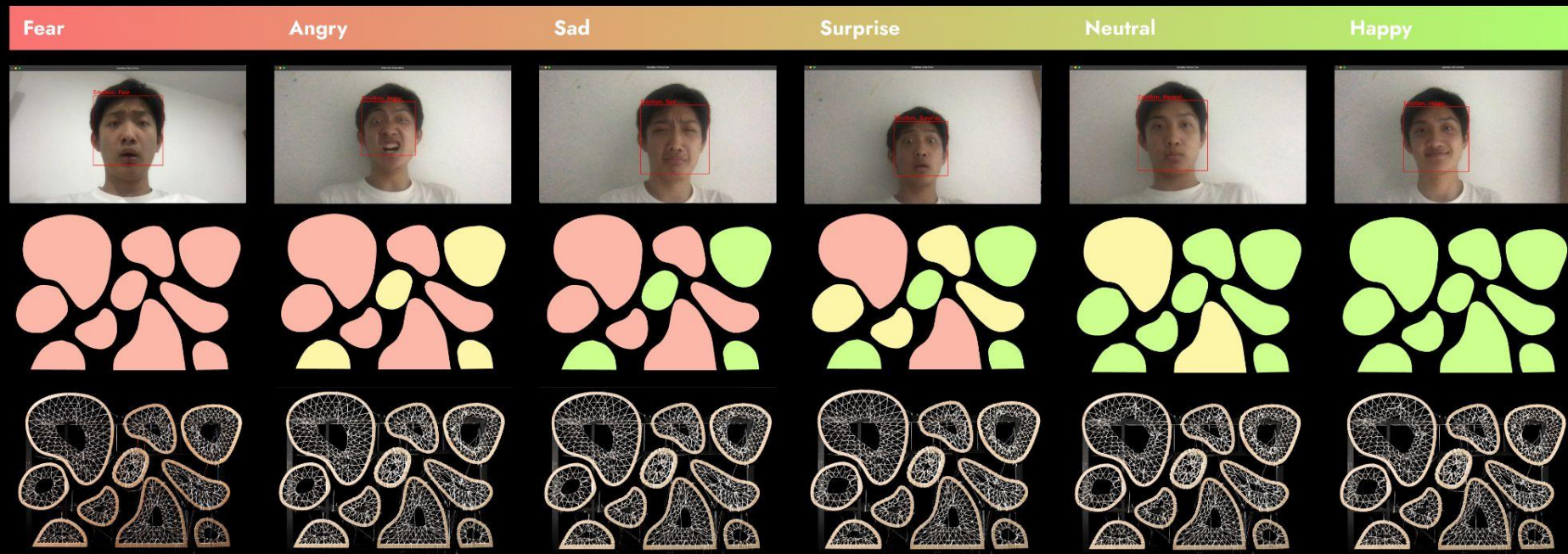
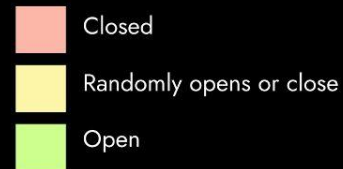
**Fishnets** with multiple layers. Strings open and close depending on their own elasticity.



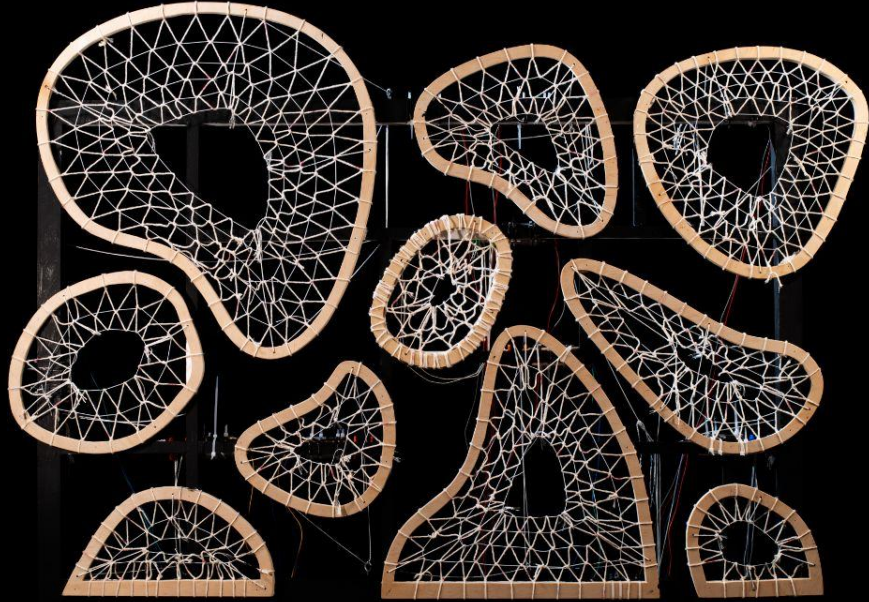
Sketches on ways the nets **move**

# Movement

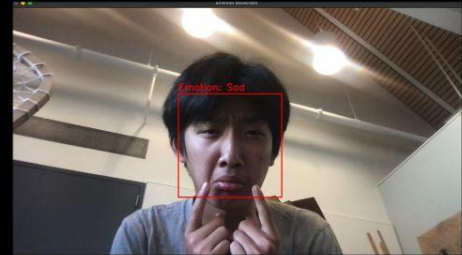
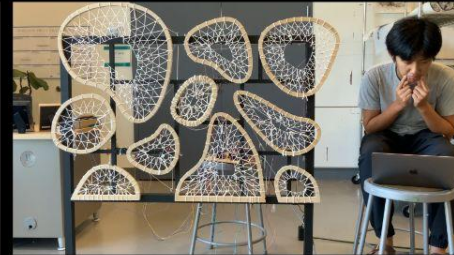
The algorithm has 6 phases, each representing a different emotion. Depending on the emotions that the camera detects, the code determines how much the wall will open.



# In The House

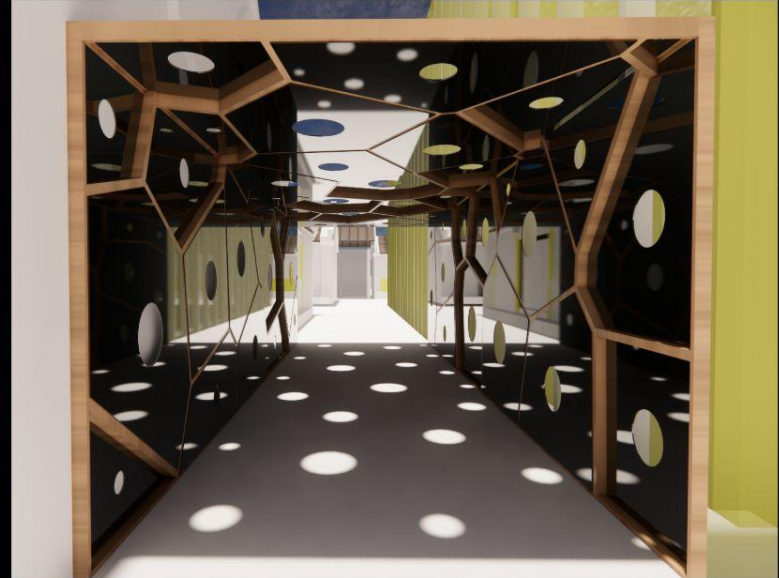


A divider between two bedrooms. The nets open when the wall detects happiness in the room, which means people are prone to communication. On the other hand, it closes when people are feeling negative, avoiding potentially bad interactions.



# In A Tunnel

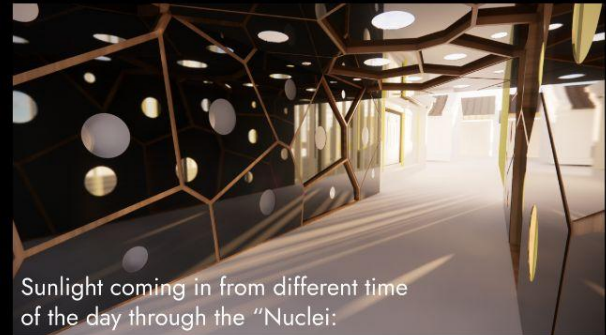
The wall can also be placed in the public to serve as a walkway. A different organic movement that it creates can hopefully make people walking through it feel better and hence create a more friendly community.



Patterns created to imitate plant cells and nuclei



In and Out movement just like heart beat.



Sunlight coming in from different time of the day through the "Nuclei":