JOURNAL

Week 5 selection

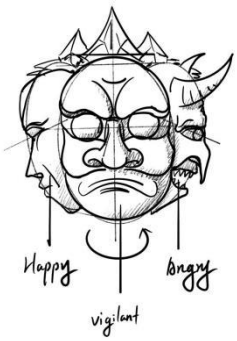
We worked on this project as a team of two, Luyang Xing and Yining Jiang, and we were able to view a number of Arduino art installations and learn about some of the components that are commonly used. During the discussion of the project, Yining Jiang described what it is like to have bipolar disorder from a patient's point of view and proposed an Arduino installation to represent the patient's reactions in social situations, as a way to educate society about bipolar disorder and to promote a more socially appropriate way of treating the patient.

Our idea came from Melissa Walker's art therapy. Her work is exploring a safe way to help patients release their feelings and emotions. We plan to express the patient's emotions through 3 different masks paired with different voices. As the experiencer comes into contact with the device in different ways, the device will show different emotional responses.

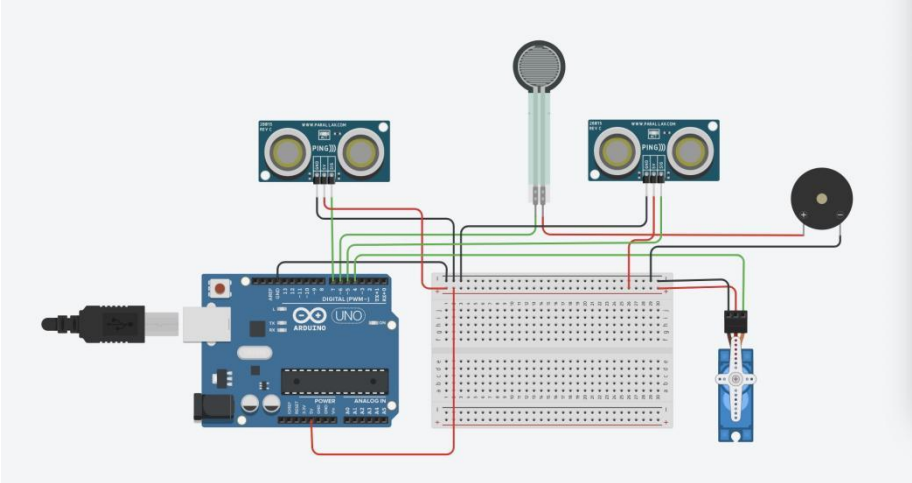
Input: ultrasonic distance sensor, sound sensor, touch sensor
Output: Servo, buzzer, MP3 module + speaker

Initial settings: step1, when user comes close, ultrasonic sensor detects signal and control micro servo twist, the mask shows vigilance face. step2, when user speaks to them, micro servo also twist and mask shows happy face. but if user touch them, pressure depends sensor receives signal and micro servo turns to angry face and buzzer screams.(old version)

Sketch:



Circuit diagram (old version):



PPT:https://docs.google.com/presentation/d/1DQ6-lhXv8Yz-GG_ILlgUh3fU0BvF1b61IDQpHo8U9ag/edit#slide=id.p

feedback & improvement

FEEDBACK: bipolar disorder is very complicated, we can't just simply summarise it as three emotions. IMPROVEMENT: So we plan to skip the bipolar disorder part and describe my personal experience of going through bipolar disorder instead. Also, we can conceal the other two faces, and user can not see all of the contents so that they won't know we only have these three states.

FEEDBACK: Something happening versus you touching it and something happened is very interesting. But how do we invite the user to either speak or touch? How do they know that is how I interact with this project? IMPROVEMENT: Add ****instructions notes. Or the more imaginative way—interface, microphone, surface e.g. (instructions Not decided)

FEEDBACK: All of the sensors need to be put in a house. IMPROVEMENT: we need to discuss how it looks like in the end (Exterior not decided).

FEEDBACK: The relationship between interaction and emotion expression? For instance, if I speak loud or even shout to the sensor, does it still feel happy? Then what about fondle slightly and flap? IMPROVEMENT: we can change the output effect base on volume, pressure and distance. Like volume low→happy face, volume high→vigilance face.

FEEDBACK: We have 2 people, so maybe we can have 3 outputs. IMPROVEMENT: Add a motor, and combine several sensors to get different output.

Material & art style of mask template: not decided. Human face or monster? 3D print or cardboard?

Week 6

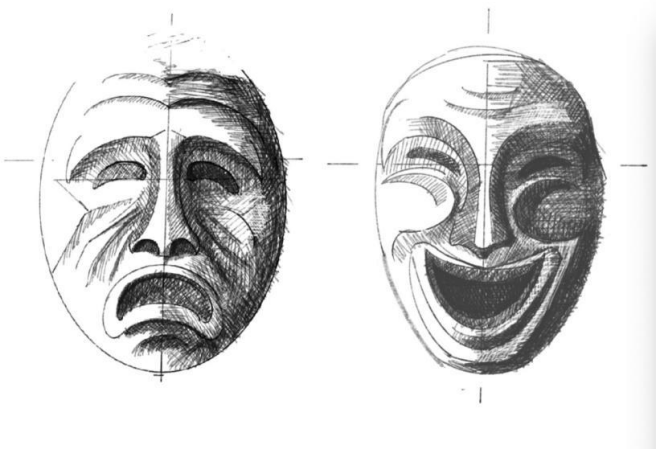
We have a meeting, and this is my note of the discussion
We need to do background research about bipolar disorder group. Explore their main emotions.

About how our house and faces look like: the emotion of our faces can be modified as happy, angry and depressed. (because this is the most common emotions in bipolar disorder).The physical discomfort caused by taking medication during the treatment, vomiting diarrhoea acne etc. Repairing the spirit while bringing about the withering of the body. The appearance of the mask (overall style) is in tatters.

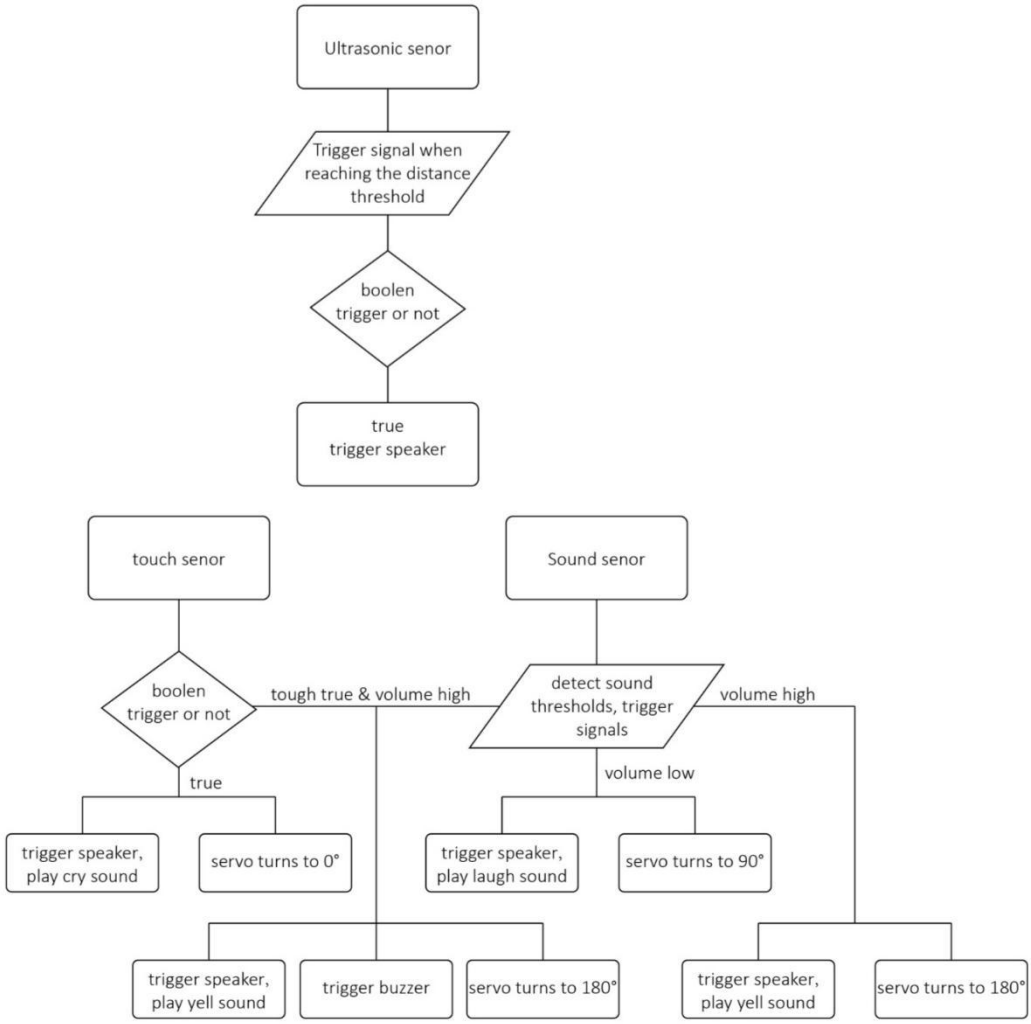
Device settings update: The motor used to trigger the vibrations has been removed. An introductory sound effect is triggered the first time the experience approaches the device to guide the experience. Each emotion has been added to the audio feedback, with anger making a roar, happiness making a laugh and depressed making a cry.

Mask design: The decision was made to abandon complex mask designs in favour of simple and straightforward emotion masks, and to complete the faces sketches.

Mask sketch:



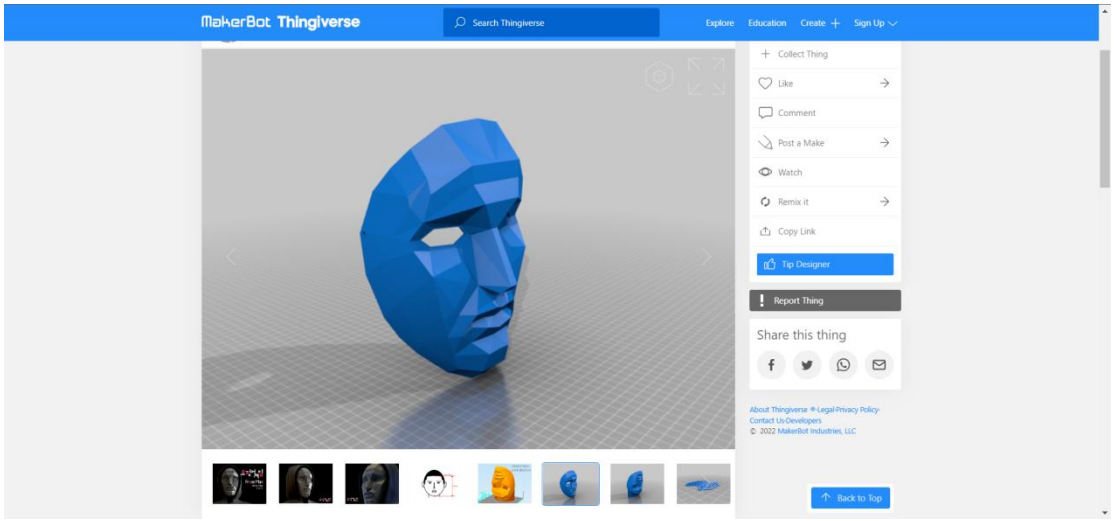
Logic diagrams:

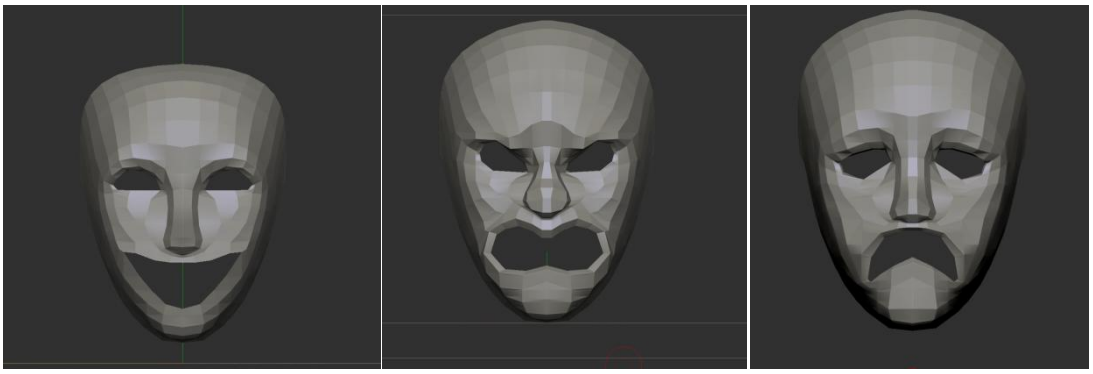


Week7

Mask material: we book a tutorial with Lieven, we can consider 3d printing and laser cutting (but Lieven recommends 3d printing). (Or: use laser cut, as low-poly. we draw every face, and cut, and stick them together. (such as the image))

Mask models: I found some free face models on the internet, to which I added expressions.

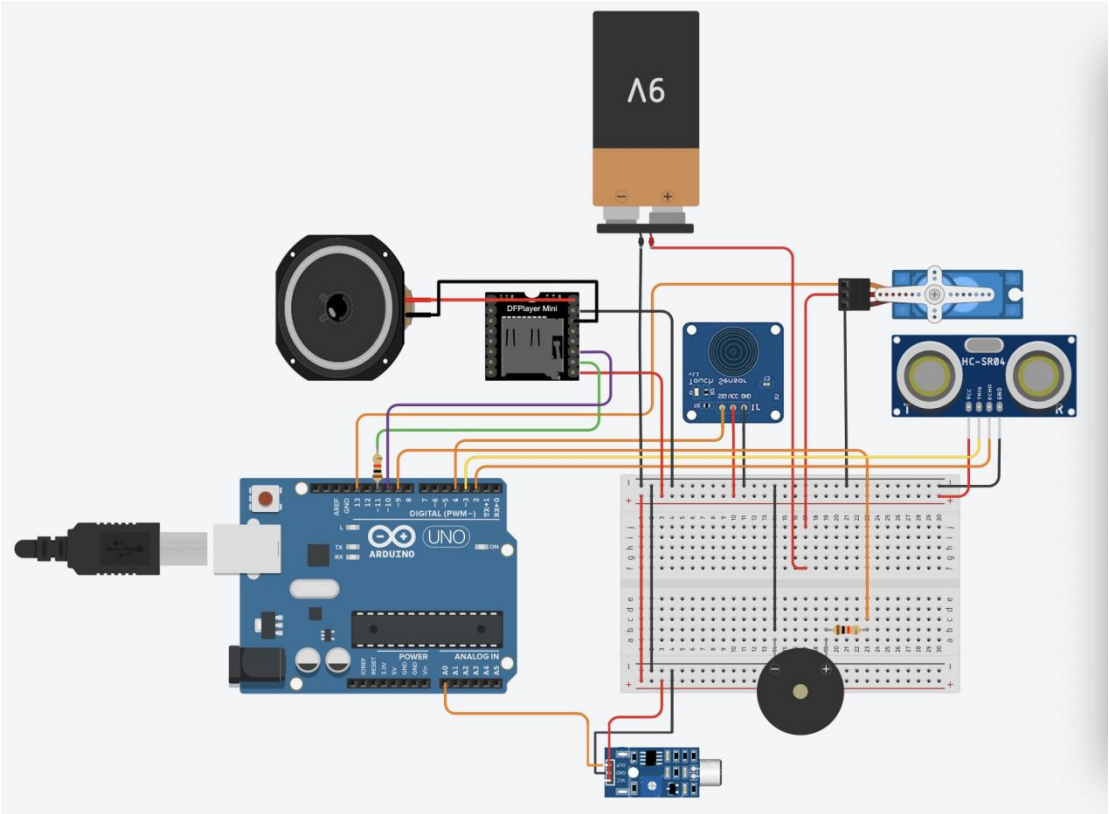




Arduino kits: To play audio, we need a DF Player(like this)

Considering the weight of the mask, we therefore need to study the weight-bearing capacity of the servo.

Circuit diagrams(New version): Touch sensor, sound sensor with DF player mini are not available in thinkercad, so diagrams found on Google instead.



Week8 code

Finished the code for the sound sensor and touch sensor to control the angle of the servo and the buzzer. Initially I planned to use a 360 degree servo, but realised that a 360 servo can only control its direction and speed, not its angle, so I chose a 180 degree servo.

Problem 1: The starting angle of 180 degree servo is 0 degrees, but its angle cannot be negative. In order to achieve this, I can set the initial angle pos to 90 degrees and turn it to 180 when condition one is met and to 0 degrees when condition two is met, otherwise it stays at 90 degrees, which can achieve a positive and negative rotation of 180 degree servo by 90 degrees.
Problem 2: Using the sound sensor to control the servo, when the volume is greater than 150 the servo rotates to 180 degrees, when the volume is greater than 40 and less than 120 the servo rotates to 90 and when the volume is less than 40 the servo rotates to 0 degrees. However, when the condition is met the servo rotates and immediately returns to 0 degrees. After researching this, I found that the sound sensor was less than 40 under normal conditions, so condition 3 would immediately interfere with the servo to return to 0 degrees when condition 1 or 2 was met, which has since been corrected.

```
#include <Servo.h>

const int SOUND_PIN = A0;
const int servoPIN = 13;
int buzzPin = 9;    //蜂鸣器
int touch = 2;    //触摸
Servo myservo;//命名
int pos;//角度命名


void setup() {
  myservo.attach(servoPIN);
  pinMode(touch, INPUT);
  pinMode(buzzPin, OUTPUT);

  Serial.begin(9600);
}

void loop() {
  int value = analogRead(SOUND_PIN);
  Serial.println(value);

  long frequency = 500; //频率, 单位Hz

  if (digitalRead(2) && value >= 120) {
    myservo.write(180);

    tone(buzzPin, frequency );
    delay(5000);
  }
  else {
    noTone(buzzPin);//停止发声
  }

  if (value >= 150) {
    myservo.write(180);
    delay(3000);
  }
  if (value >= 40 && value < 120) {
    myservo.write(90);
    delay(500);
  }

  if (digitalRead(2) && value < 40) {
    myservo.write(0);
    delay(500);
  }
}
```

Check the code information of DF player mini and write some code which is not used later.

```
#include "SoftwareSerial.h"
#include "DFPlayer_Mini_Mp3.h"

SoftwareSerial mySerial(10, 11);

const int trigPin = 3;
const int echoPin = 2;
long duration;
int distance;


void setup() {
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT);

  Serial.begin(9600);
  mySerial.begin(9600);
  mp3_set_serial(mySerial);
  mp3_set_volume(20);
}

void loop() {
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin on HIGH state for 10 micro seconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  // Reads the echoPin, returns the sound wave travel time in microseconds
  duration = pulseIn(echoPin, HIGH);
  // Calculating the distance
  distance = duration * 0.034 / 2;
  // Prints the distance on the Serial Monitor
  Serial.print("Distance: ");
  Serial.println(distance);



  if (distance <= 5) {
    mp3_play(1);
    delay(5000);
  }

}
```

The final code, which combines the servo part of the code with the DF player mini finishing, resolves some bugs in the combination.

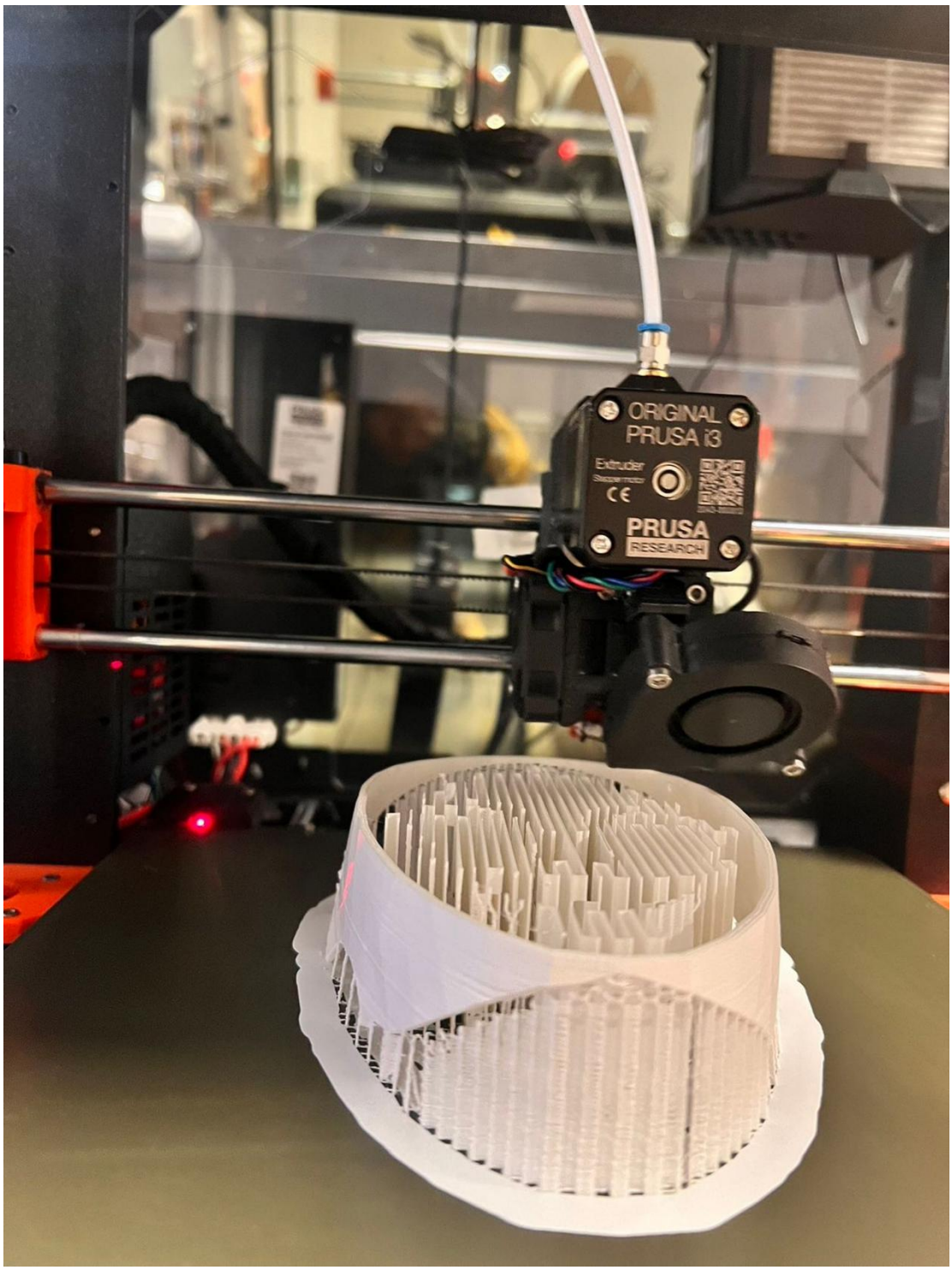
```
#include "SoftwareSerial.h"
#include "DFPlayer_Mini_Mp3.h"
#include <Servo.h>
SoftwareSerial mySerial(10, 11);
//speaker
const int trigPin = 3;
const int echoPin = 2;
long duration;
int distance;
bool firstRun = true;
bool buzzerRun = true;
//servo
const int SOUND_PIN = A0;
const int servoPIN = 13;
int buzzPin = 9;    //蜂鸣器
int touch = 4;    //触摸
Servo myservo;//命名
int pos;//角度命名

void setup() {
  // put your setup code here, to run once:
  //speaker
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT);

  Serial.begin(9600);
  mySerial.begin(9600);
  mp3_set_serial(mySerial);
  mp3_set_volume(25);
  while (!Serial) {
    ;
  }
  //servo
  myservo.attach(servoPIN);
  pinMode(touch, INPUT);
  pinMode(buzzPin, OUTPUT);

  Serial.begin(9600);
}
```

```
void loop() {
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin on HIGH state for 10 micro seconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  // Reads the echoPin, returns the sound wave travel time in microseconds
  duration = pulseIn(echoPin, HIGH);
  // Calculating the distance
  distance = duration * 0.034 / 2;
  // Prints the distance on the Serial Monitor
  Serial.print("Distance: ");
  Serial.println(distance);

  if (firstRun == true && distance <= 50) {
    mp3_play(1);
    firstRun = false;
    delay(17000);
  }

  int value = analogRead(SOUND_PIN);
  Serial.println(value);

  long frequency = 500; //频率，单位Hz

  if (digitalRead(4) && value >= 80) {
    myservo.write(180);//触摸+声音大，转向怒+蜂鸣器叫
    tone(buzzPin, frequency );//buzzer screaming
    delay(5000);
  }
  else {noTone(buzzPin);//停止发声
  }
  //pos = map(value, 0, 1023, 0, 180);
  //myservo.write(pos);

  if (value >= 150) {
    mp3_play(4);
    myservo.write(180);//大声说话转向愤怒，愤怒音效
    delay(3000);
  }
  if (value >= 40 && value < 120) {
    mp3_play(3);//低声说话转向笑，播放笑声
    myservo.write(90);
    delay(3000);
  }
  if (digitalRead(4) && value < 40 && myservo.read() != 0) {
    mp3_play(2);//触摸转向忧郁，播放哭
    myservo.write(0);
    delay(7000);
```

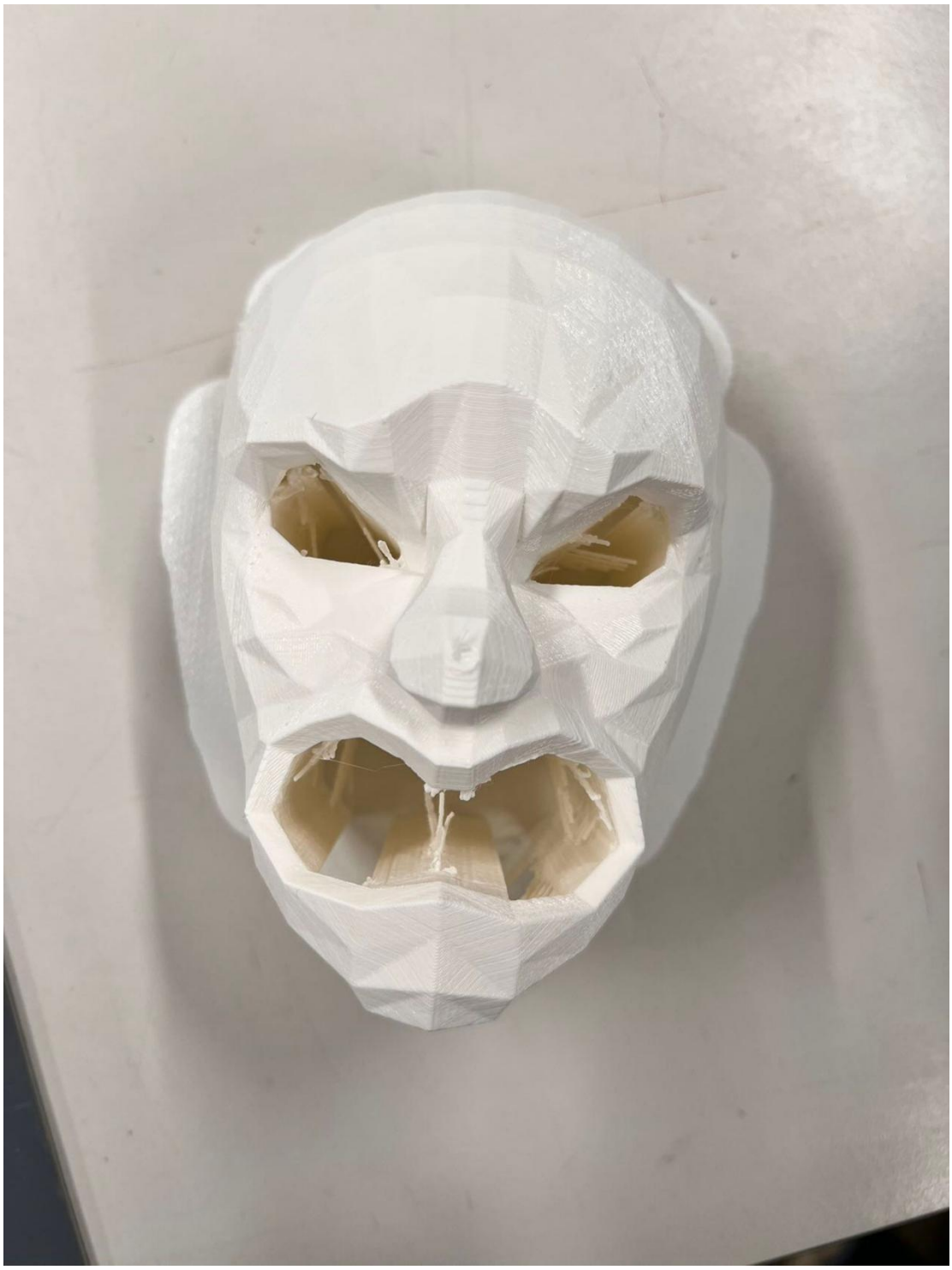
Test video：https://www.youtube.com/shorts/pYrivrOkVxc

Week9

3D print model: We used the printer on the fourth floor to print our first mask. There was a long queue here and we switched to an off-campus printer so as not to disrupt the project. However, there were some gaps in the printed masks due to inconsistent materials.

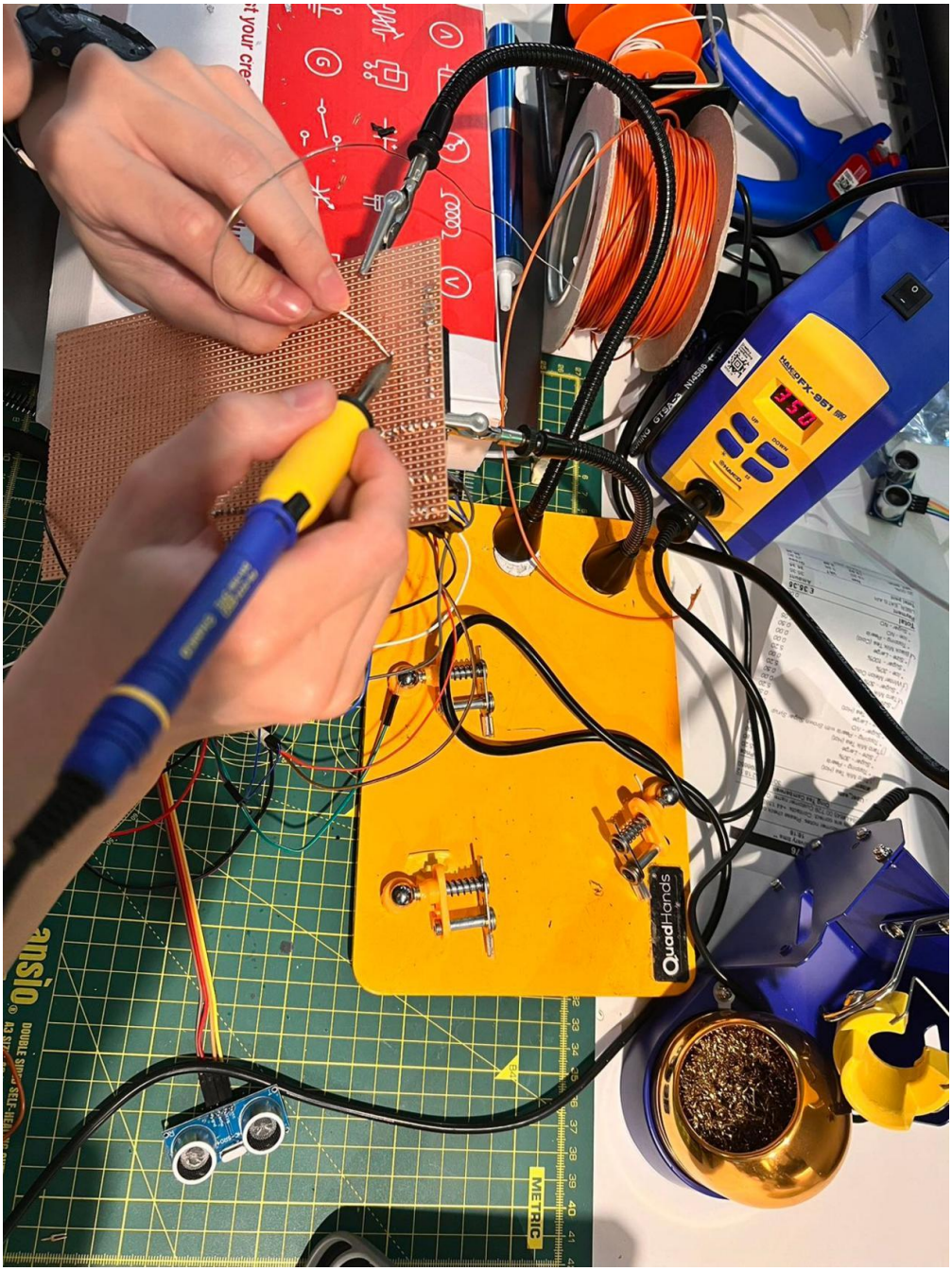



Network

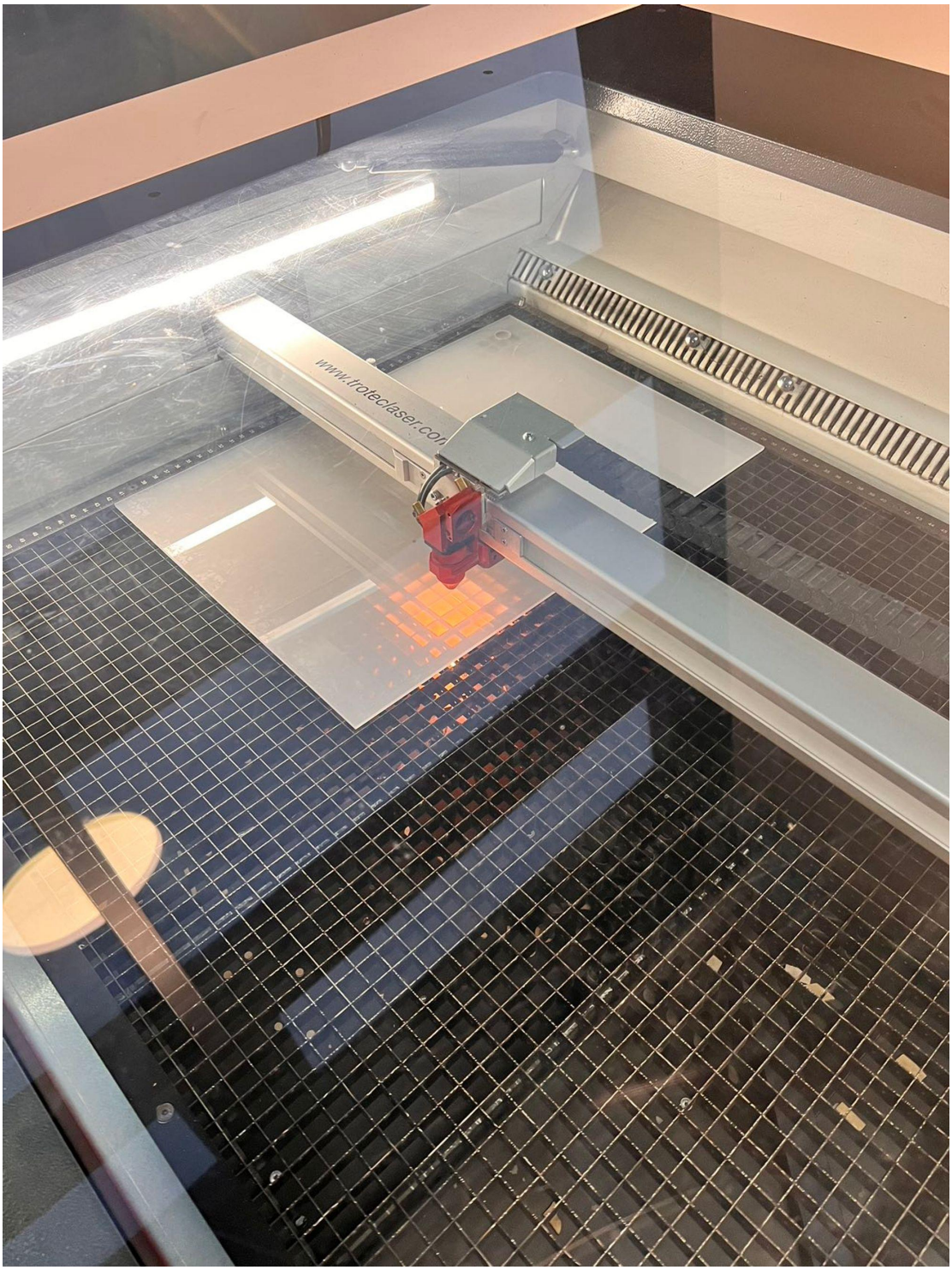


Soldering vedio:
https://s3.us-west-2.amazonaws.com/secure.notion-static.com/541eb110-06ef-4811-881a-67a56e83a07d/345760b3aa24b587a9de04b2d058cf72.mp4?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Content-Sha256=UNSIGNED-PAYLOAD&X-Amz-Credential=AKIAT73L2G45EIPT3X45%2F20221209%2Fus-west-2%2Fs3%2Faws4_request&X-Amz-Date=20221209T080133Z&X-Amz-Expires=86400&X-Amz-Signature=b4aa378816bf2b767bd5035bf0f76add2b9225527edb36f89bdf0d0793eb09de&X-Amz-SignedHeaders=host&x-id=GetObject

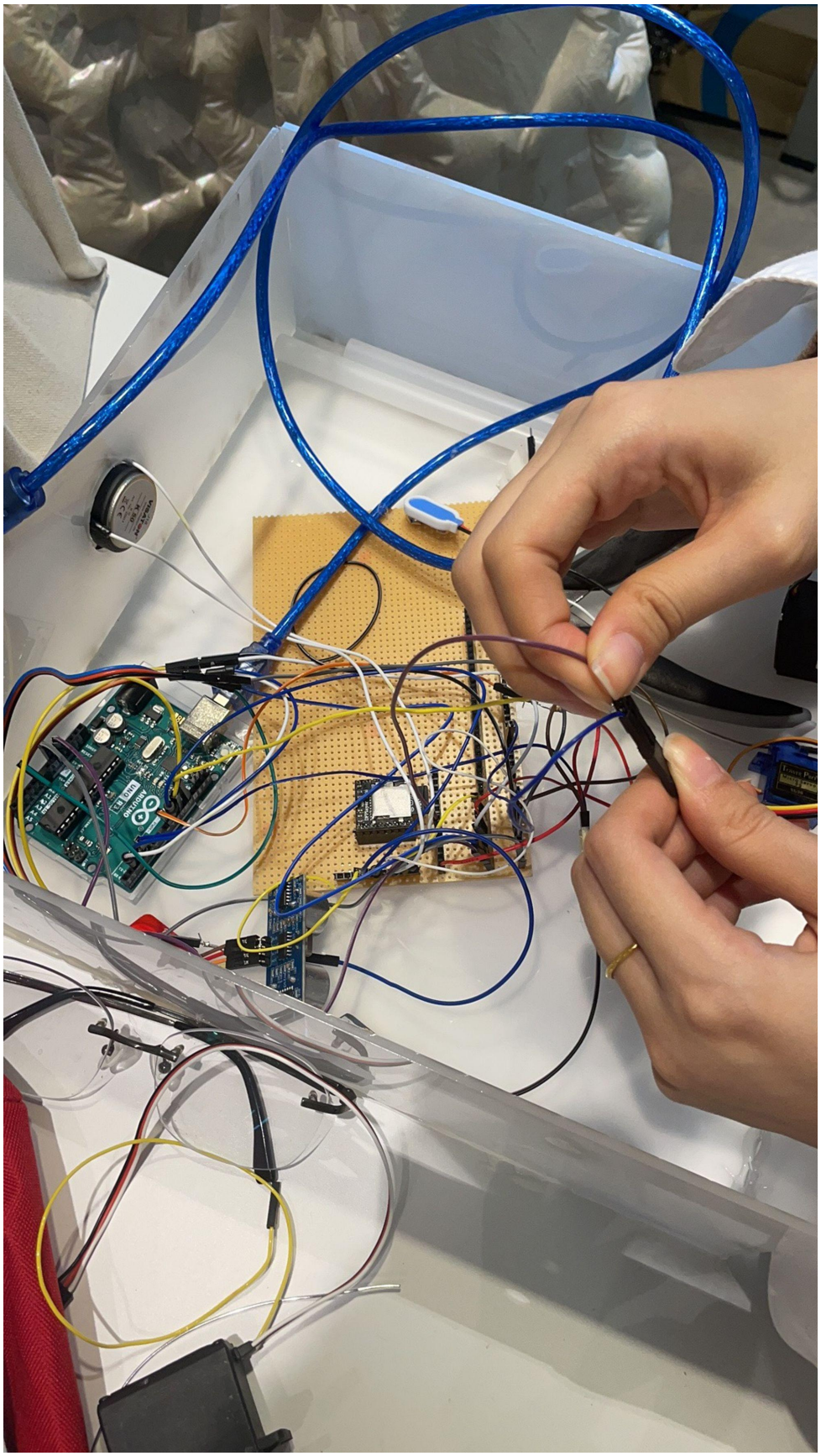
I used a header for every solder as per my teacher's request, safety first, and although it was a pain in the ass, he effectively prevented short circuits.



Laser cutting:
Making boxes using laser cutting.

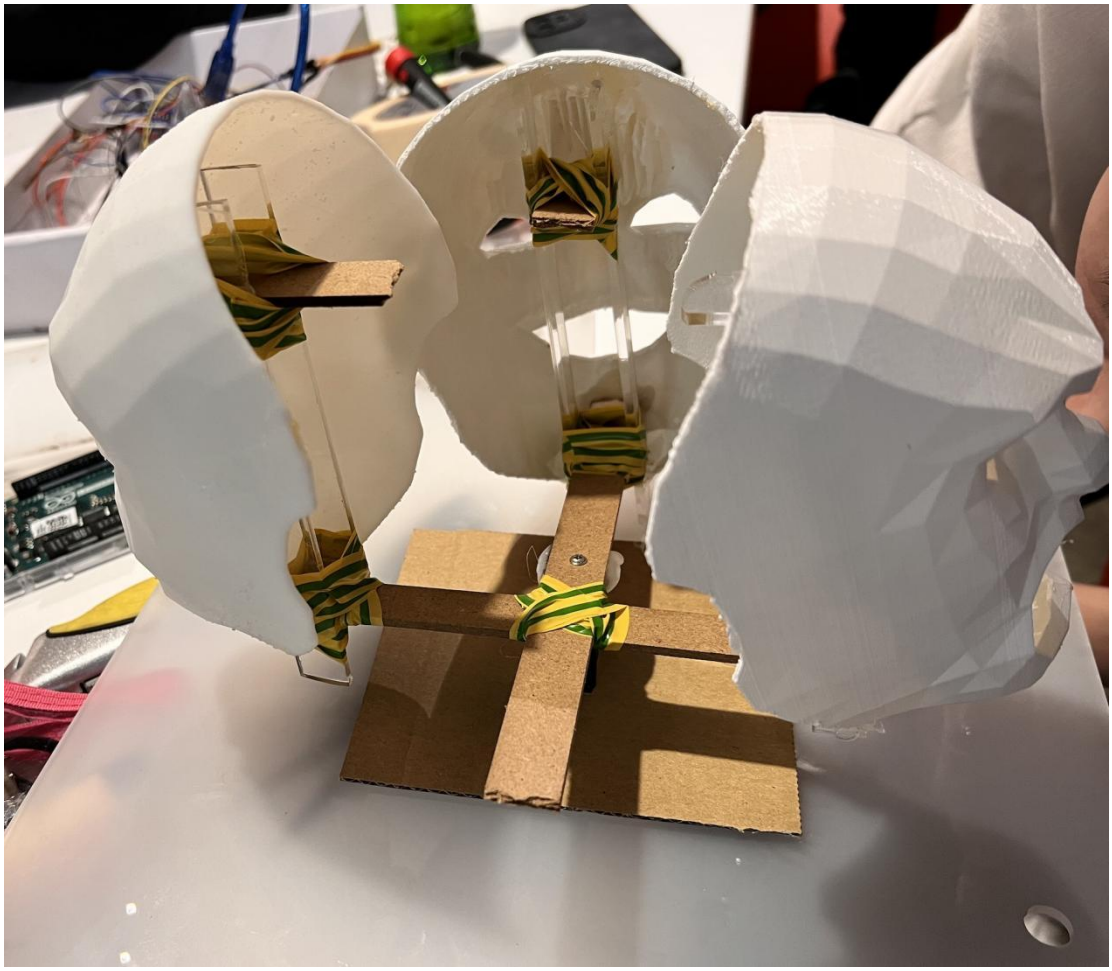


Assembl:

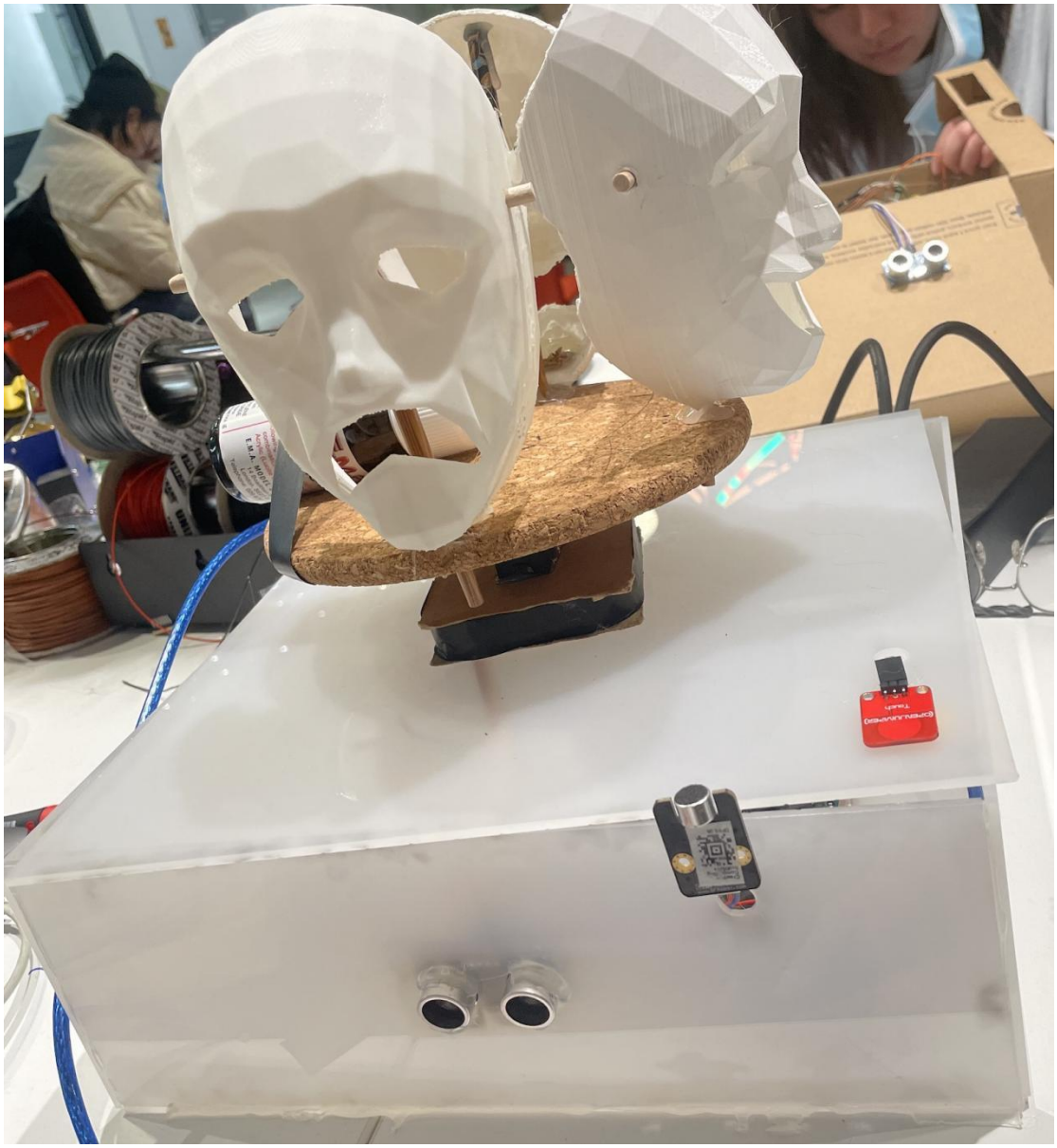


Failed architecture with uneven weight causing the unit to tilt and crush the rudder.

This is our first trial. We literally use the rubbish we pick up for skeleton(wood and acrylic). the structure is really unstable. As a result, the servo broke that night… The little servo is carrying too much weight that it shouldn't ...

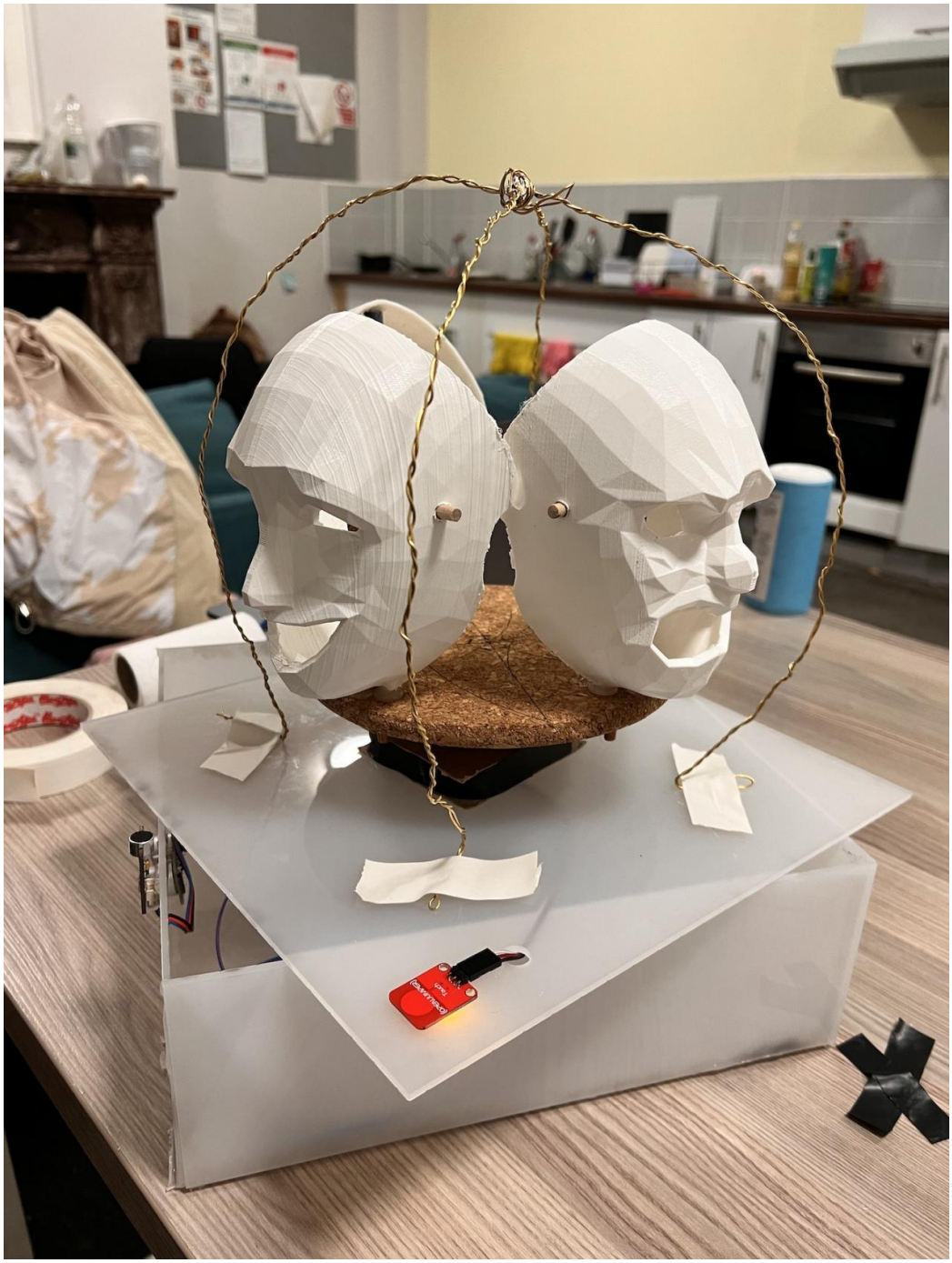


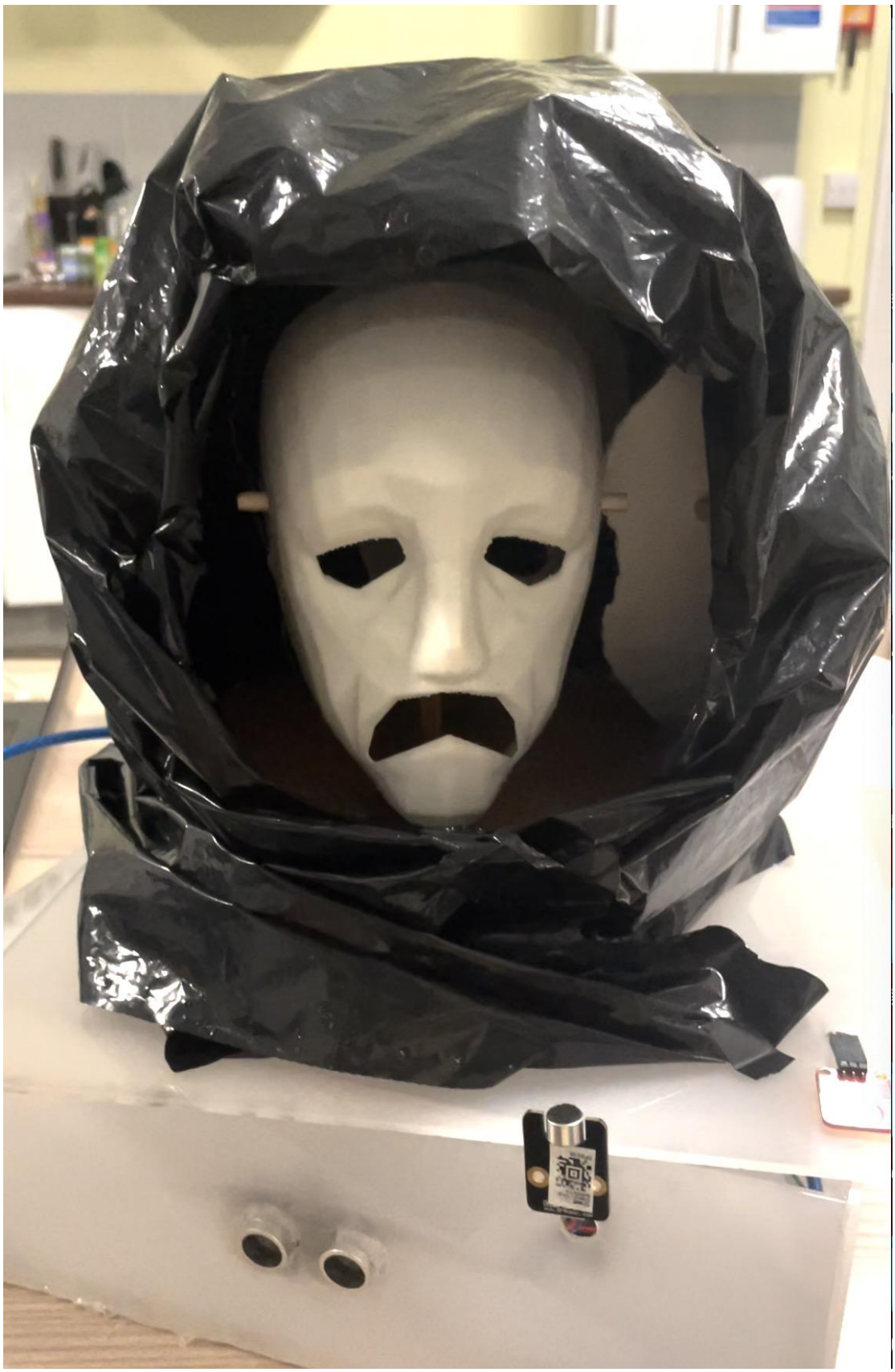
A large disc was eventually added to share the weight, but it's not very pretty.



Because in a previous presentation, a student suggested wrapping up the other masks to reveal only the front mask. Tried it out. Make some skeleton on the inside with wire and use a rubbish bag to make a hood to wrap around the mask. Only one side could be seen, but it was not very satisfactory and was not used in the end.

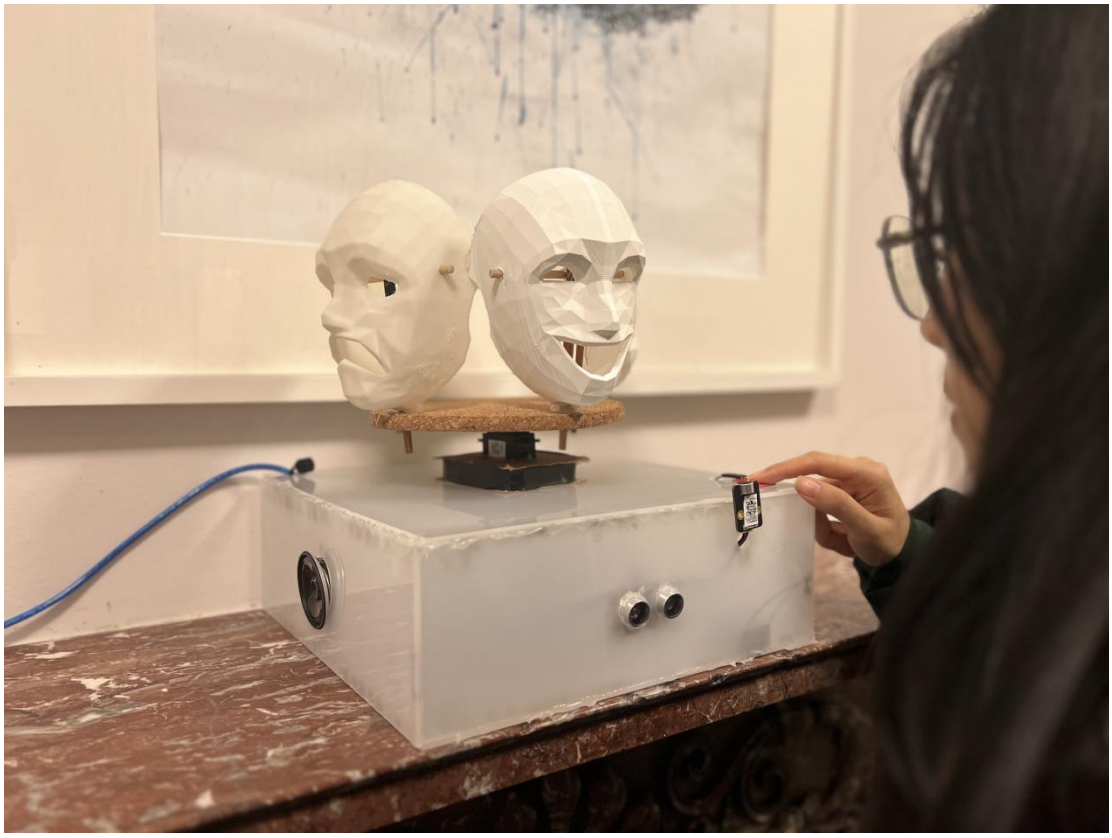
https://s3.us-west-2.amazonaws.com/secure.notion-static.com/5eaff6f4-f756-4655-a6e8-f6f0a9803de3/Untitled.mp4?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Content-Sha256=UNSIGNED-PAYLOAD&X-Amz-Credential=AKIAT73L2G45EIPT3X45%2F20221209%2Fus-west-2%2Fs3%2Faws4_request&X-Amz-Date=20221209T104009Z&X-Amz-Expires=86400&X-Amz-Signature=fbe70e5a2e8038ea8df70ee0f5cc3a818c71ba543e36115939f935efce2e3977&X-Amz-SignedHeaders=host&x-id=GetObject





Final test, take video

Video link: https://youtu.be/Vyxm8jKVhX8



Future

I wanted to refine some of the suggestions made by the teacher and they didn't come to completion or the changes failed. For example, refining the structure to make it more aesthetically pleasing and blocking it with boxes so that the user can only see a face. If I had the chance, I would like to enrich the code and add some dialogue content.