TREFACE

Group member name: Luyang Xing, Yining Jiang

Demonstration video link: https://youtu.be/Vyxm8jKVhX8

Luyang’s work : servo,touch, sound, buzzer code. Final assembly, modeling. Circuit diagram.

Yining’s work: speaker, ultrasonic code, optimise entire code and organise them together. 3D printing. Laser cutting. Final assembly.

Yining’s journal link: https://www.notion.so/Creative-Making-Advanced-Physical-Computing-0373dc64f05441dda7228c78b30f1a69

Yining’s code link: https://www.notion.so/Code-c08eb9e9c1894a859e292d4bf4dadb9b

Luyang’s journal and code link: https://github.com/Yyyoung6699/Creative-Making-Advanced-Physical-Computing1

brief: Our project is to explore the possibility of Arduino installation to express the feelings of Yining during an episode of bipolar disorder which can be represented by three different faces.

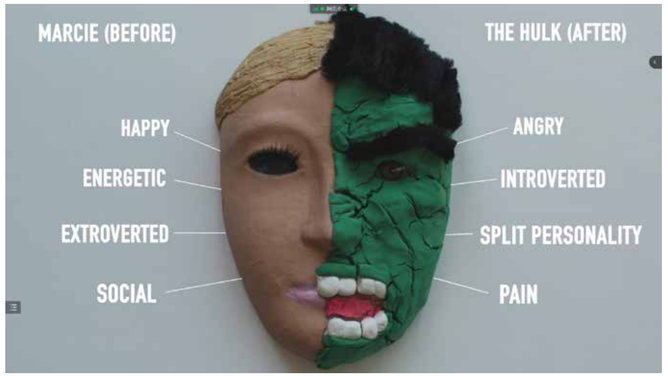
BACKGROUND

Bipolar disorder, previously known as manic depression, is a mental disorder characterized by periods of depression and periods of abnormally elevated mood that last from days to weeks each. During mania, an individual behaves or feels abnormally energetic, happy or irritable, and they often make impulsive decisions with little regard for the consequences. There is usually also a reduced need for sleep during manic phases. During periods of depression, the individual may experience crying and have a negative outlook on life and poor eye contact with others.

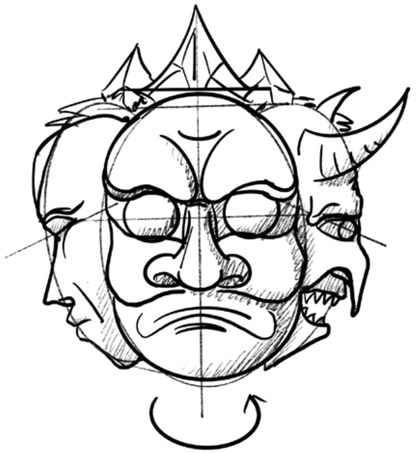
As a patient with bipolar disorder, Yining doesn't think her family cared enough about her illness, and she was even ridiculed and laughed at by people around her. Many people have not come into contact with people with bipolar disorder in their lives, and some have learned about the illness through film and television (such as documentary *Stephen Fry: The Secret Life of the Manic Depressive*). However, when the illness strikes, everyone is different. Most people know little about bipolar disorder and even have prejudices. So Yining wanted to use her personal experience as inspiration to create an interactive installation to share with the audience how she felt during an episode of bipolar disorder to raise people's awareness of the condition.

INSPIRATION

Our idea is from Melissa Walker's arts therapy. Her job is to explore a safe manner to help patients release their feelings and emotions. We think People with bipolar disorder's psychological and physiological aspects can also be represented by masks. So we want to make a installation with different faces to show different emotions.



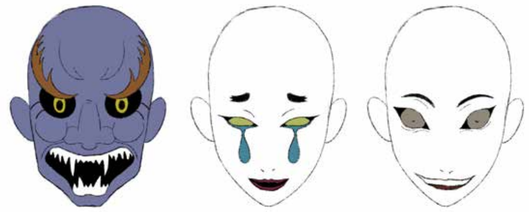
Melissa Walker's work



Our Prototype

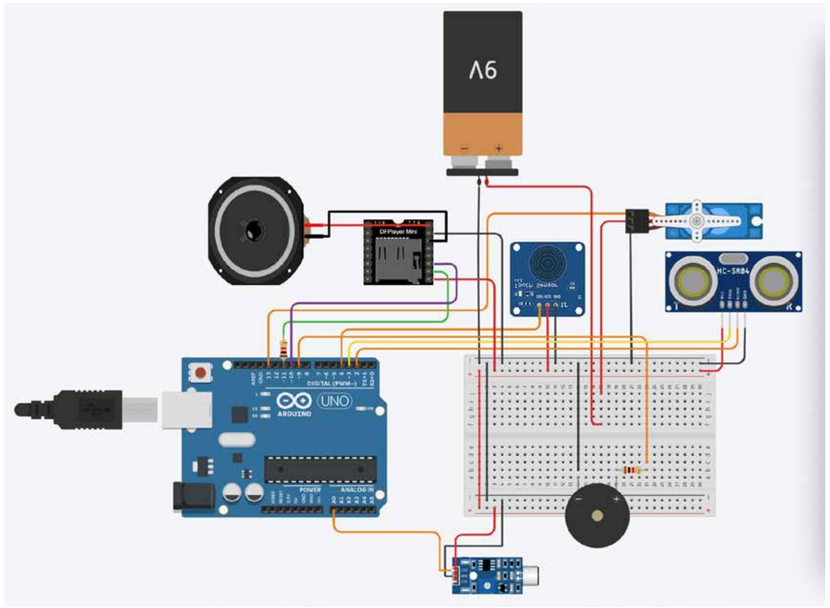
The causes and symptoms of bipolar disorder are complex, but mania and depression are the two main and most common states, with abnormally happy and extremely angry being the two extremes of the manic state. So we sum it up simply with happy, manic and sad.

Luyang's Sketch



Yining's Sketch

CIRCUIT DIAGRAM



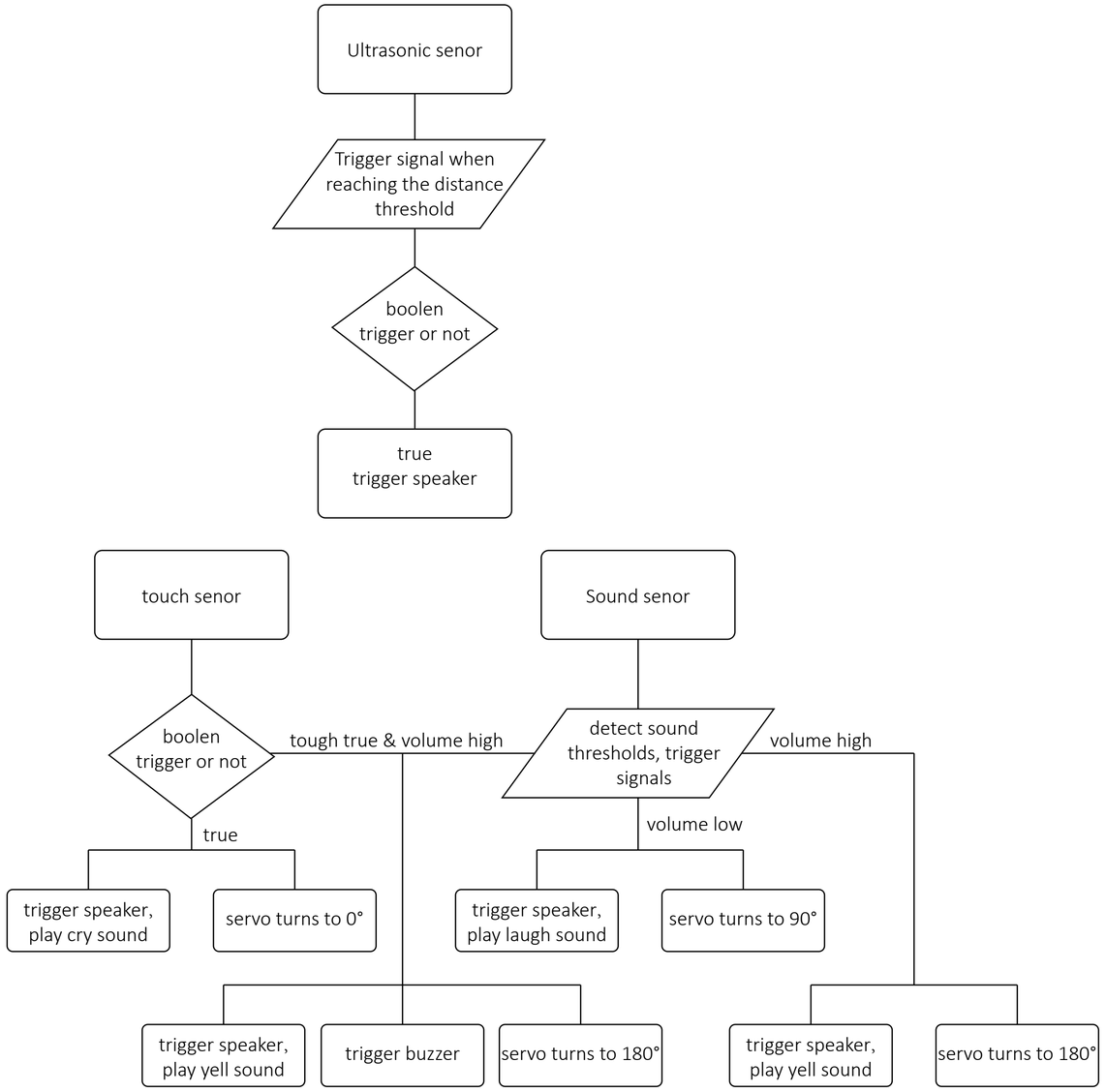
CONCEPT

- Input
  - Ultrasonic Sensor
  - Sound Sensor
  - Touch Sensor
- Output
  - Servo
  - Buzzer
  - DF Player Mini & Speaker

ARDUINO CODE

```
SoftwareSerial mySerial(10, 11);
//speaker
const int trigPin = 3;
const int echoPin = 2;
long duration;
int distance;
bool firstRun = 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() {
  //speaker
  pinMode(trigPin, OUTPUT); // Se
  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() {
  //speaker
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH
  distance = duration * 0.034 / 2;
  // Prints the distance on the Serial Monit
  Serial.print("Distance: ");
  Serial.println(distance);

//Yining
  if (firstRun == true && distance <= 10) {
    mp3_play(1);
    firstRun = false;
    delay(10000);
  }

  //servo part
  int value = analogRead(SOUND_PIN);
  Serial.println(value);

  long frequency = 500; //频率, 单位Hz

  if (digitalRead(4) && value >= 150) {
    myservo.write(180);//触摸+声音大，转向怒+蜂
    tone(buzzPin, frequency );//buzzer screa
    delay(5000);
  }
  else {
    noTone(buzzPin);//停止发声
  }
   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 >= 80 && value < 150) {
    mp3_play(3);//低声说话转向笑，播放笑声
    myservo.write(90);
    delay(3000);
   }
   //Yining
   if (digitalRead(4)&&value<80&&myservo.read()!=0){
    mp3_play(2);//触摸转向忧郁，播放哭
    myservo.write(0);
    delay(5000);
   }
}
```

FLOW CHART



CHALLENGES

Main Diffculty in coding

1. The audio instruction will be triggered repeatedly when the user comes close to ultrasonic sensor. But we only need it to be triggered once.

We added a firstRun boolean as a condition which can limit the trigger count.

```
bool firstRun = true;
  if (firstRun == true && distance <= 10) {
    mp3_play(1);
    firstRun = false;
    delay(10000);
  }
```

2. When testing we found that touch + high volume was incorrectly judged as just touch and could not trigger both the buzzer and yell speaker audio.

We found a myservo.read() function to add condition restrictions.

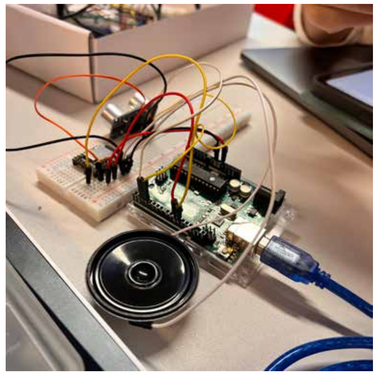
```
  if (digitalRead(4)&&value<80&&myservo.read()!=0){
    mp3_play(2);//触摸转向忧郁，播放哭
    myservo.write(0);
    delay(5000);
  }
```

Main Diffculty in assembling

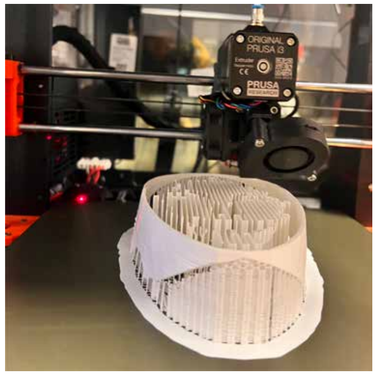
Servo is not strong enough to carry all the masks and the load-bearing structures.

We replaced the large black servo, explore other load-bearing tools and try a new structure.

PROCESS

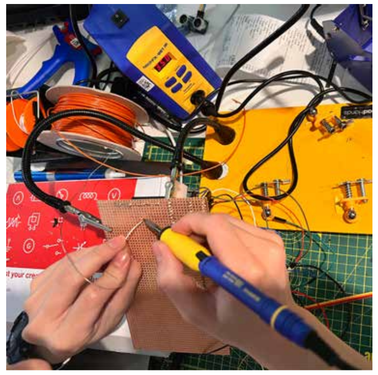


Arduino assemble

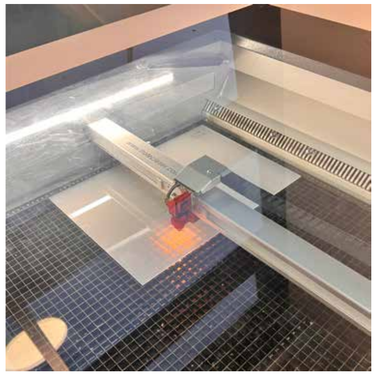


3D printing

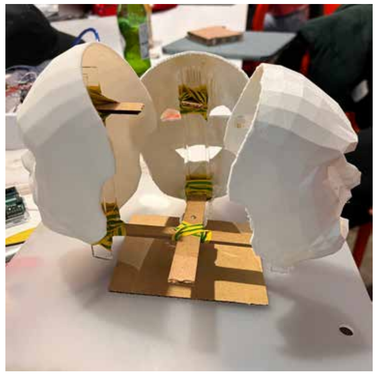
3D model



Soldering



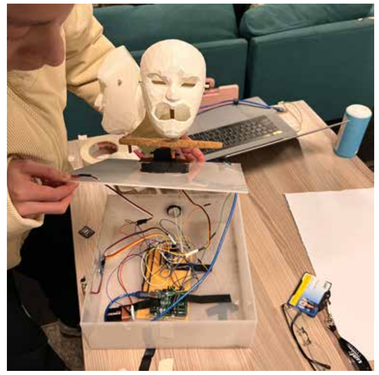
Laser cutting



Project assembling

Housing

Housing



Almost done everything

FINAL DESIGN