Young Engineers Tallahassee Presents: **The Biomechatronic Brain**

- Made by the 6th-8th Grade YET Class

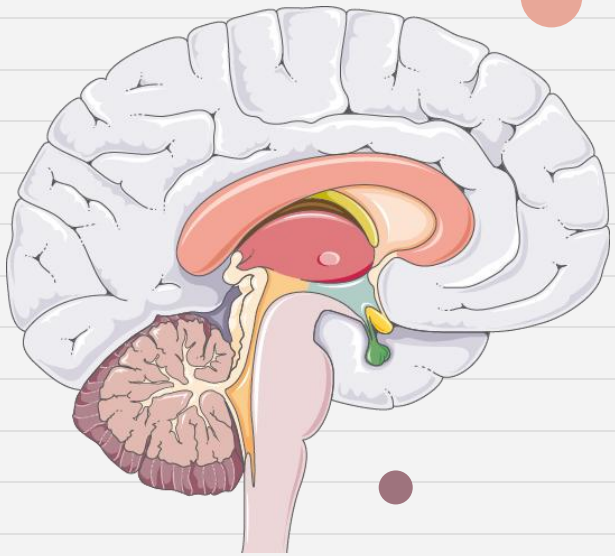


Illustration by Smart-Servier Medical Art

Table of Contents

01 Introduction

02 Sensors

03 Programming

04 Build Photos

05 Videos

01

Introduction

Explaining the background for this project and the functions of the brain.

Illustration by Smart-Servier Medical Art

Our Students!

Students excluded due to parental preferences.

What are the brain’s functions?

The brain is responsible for processing sensory information. The brain can process data from the five senses sight, taste, touch, sound, and smell. Different lobes are responsible for different senses. Occipital lobe is for sight and the temporal is responsible for hearing.

The brain is also responsible for controlling the body and all of the other organs. It also regulates bodily functions like heart rate, breathing, and digestion. The brain also controls voluntary movements such as walking and moving your arms.

A picture always reinforces the concept.

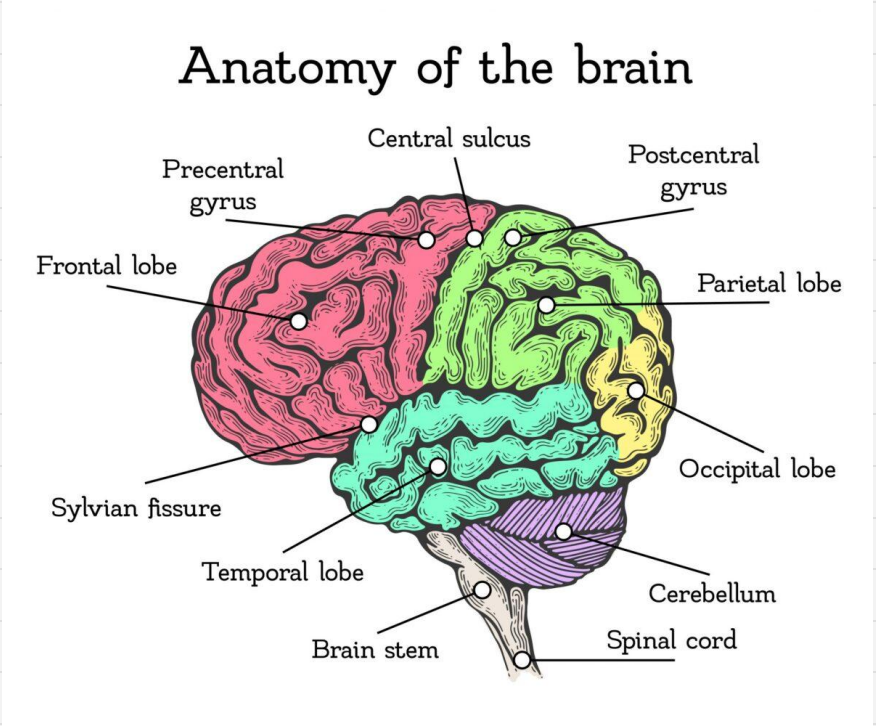


Illustration by Smart-Servier Medical Art

02

The Sensors!

The sensors we used for our brain! :)

Buzzer



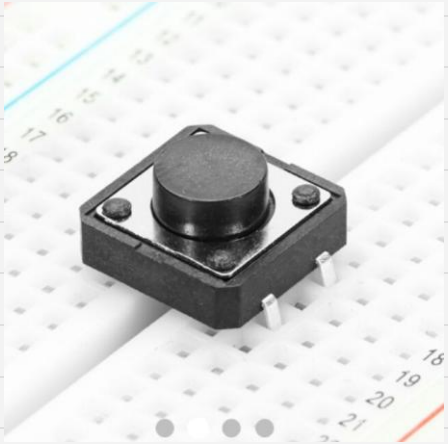
Distance Sensor



LEDs



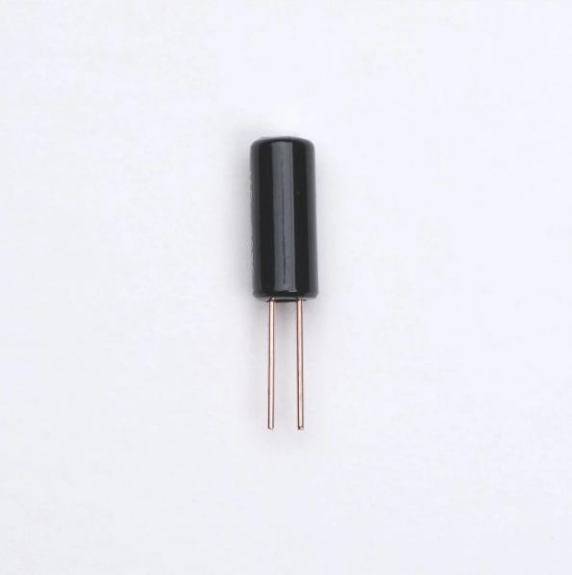
Button



Photoresistor



Tilt Sensor



03

Programming

The Arduino code we used to program the brain.

Illustration by Smart-Servier Medical Art

Full Code

```
// --- PIN DEFINITIONS ---
const int frontalLED = 11;
const int brainstemLED = 3;
const int temporalLED = 10;
const int buzzerPin = 8;
const int cerebellumLED = 9; // Your LED pin
const int occipitalLED = 6;

// --- SENSOR PINS ---
const int buttonPin = 7; // button pin
const int tiltPin = 4;       // Your tilt sensor pin
const int trigPin = 13;
const int echoPin = 12;
const int photoPin = A3;
```

```
16  void setup() {
17    Serial.begin(9600);
18
19    pinMode(frontalLED, OUTPUT);
20    pinMode(brainstemLED, OUTPUT);
21    pinMode(temporalLED, OUTPUT);
22    pinMode(buzzerPin, OUTPUT);
23    pinMode(cerebellumLED, OUTPUT);
24    pinMode(occipitalLED, OUTPUT);
25
26    pinMode(buttonPin, INPUT_PULLUP);
27    pinMode(echoPin, INPUT);
28    pinMode(trigPin, OUTPUT);
29
30    // Tilt Sensor Setup
31    pinMode(tiltPin, INPUT);
32    digitalWrite(tiltPin, HIGH); // Turn on internal pull-up
33  }
```

```
35  void loop() {
36    // 1. DISTANCE SENSOR (Frontal Lobe)
37    digitalWrite(trigPin, LOW);
38    delayMicroseconds(2);
39    digitalWrite(trigPin, HIGH);
40    delayMicroseconds(10);
41    digitalWrite(trigPin, LOW);
42
43    long duration = pulseIn(echoPin, HIGH, 10000);
44    int distance = duration * 0.034 / 2;
45
46    if (distance > 0 && distance < 20) {
47      digitalWrite(frontalLED, HIGH);
48      digitalWrite(temporalLED, HIGH);
49      tone(buzzerPin, 2500);
50    } else {
51      digitalWrite(frontalLED, LOW);
52      digitalWrite(temporalLED, LOW);
53      noTone(buzzerPin);
54    }
```

```
  // 2. BUTTON (Brainstem)
  if (digitalRead(buttonPin) == LOW) { digitalWrite(brainstemLED, HIGH); }
  else { digitalWrite(brainstemLED, LOW); }

  // 3. TILT (Cerebellum) - Updated to match your new simplified logic
  if (digitalRead(tiltPin)) {
    digitalWrite(cerebellumLED, HIGH); // Turn on the LED
  } else {
    digitalWrite(cerebellumLED, LOW);  // Turn off the LED
  }

  // 4. PHOTO (Occipital) - D0 Digital Logic
  if (digitalRead(photoPin) == LOW) {
    digitalWrite(occipitalLED, HIGH);
  } else {
    digitalWrite(occipitalLED, LOW);
  }

  delay(10);
}
```

Frontal Lobe (Distance Sensor)

```
36  // 1. DISTANCE SENSOR (Frontal Lobe)
37  digitalWrite(trigPin, LOW);
38  delayMicroseconds(2);
39  digitalWrite(trigPin, HIGH);
40  delayMicroseconds(10);
41  digitalWrite(trigPin, LOW);
42
43  long duration = pulseIn(echoPin, HIGH, 10000);
44  int distance = duration * 0.034 / 2;
45
46  if (distance > 0 && distance < 20) {
47    digitalWrite(frontalLED, HIGH);
48    digitalWrite(temporalLED, HIGH);
49    tone(buzzerPin, 2500);
50  } else {
51    digitalWrite(frontalLED, LOW);
52    digitalWrite(temporalLED, LOW);
53    noTone(buzzerPin);
54  }
```

Temporal Lobe (Buzzer)

```
if (distance > 0 && distance < 20) {
  digitalWrite(frontalLED, HIGH);
  digitalWrite(temporalLED, HIGH);
  tone(buzzerPin, 2500);
} else {
  digitalWrite(frontalLED, LOW);
  digitalWrite(temporalLED, LOW);
  noTone(buzzerPin);
}
```

Brainstem (Button)

```
56  // 2. BUTTON (Brainstem)
57  if (digitalRead(buttonPin) == LOW) { digitalWrite(brainstemLED, HIGH); }
58  else { digitalWrite(brainstemLED, LOW); }
59
60  // 3. TILT (Cerebellum) - Updated to match your new simplified logic
61  if (digitalRead(tiltPin)) {
62    digitalWrite(cerebellumLED, HIGH); // Turn on the LED
63  } else {
64    digitalWrite(cerebellumLED, LOW);  // Turn off the LED
65  }
```

Cerebellum (Tilt Sensor)

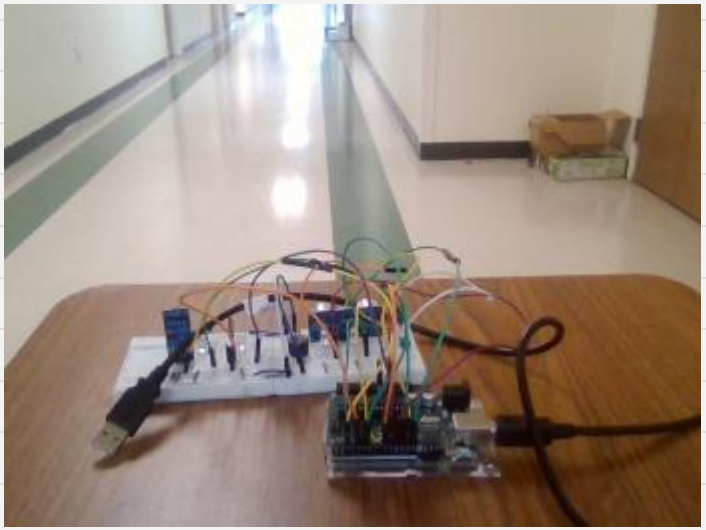
```
60  // 3. TILT (Cerebellum) - Updated to match your new simplified logic
61  if (digitalRead(tiltPin)) {
62    digitalWrite(cerebellumLED, HIGH); // Turn on the LED
63  } else {
64    digitalWrite(cerebellumLED, LOW);  // Turn off the LED
65  }
```

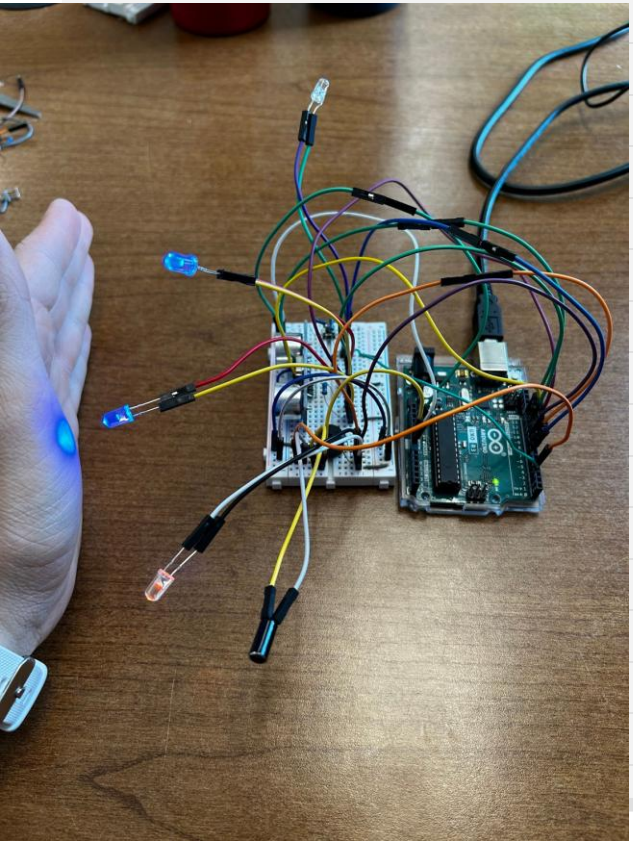
Illustration by Smart-Servier Medical Art

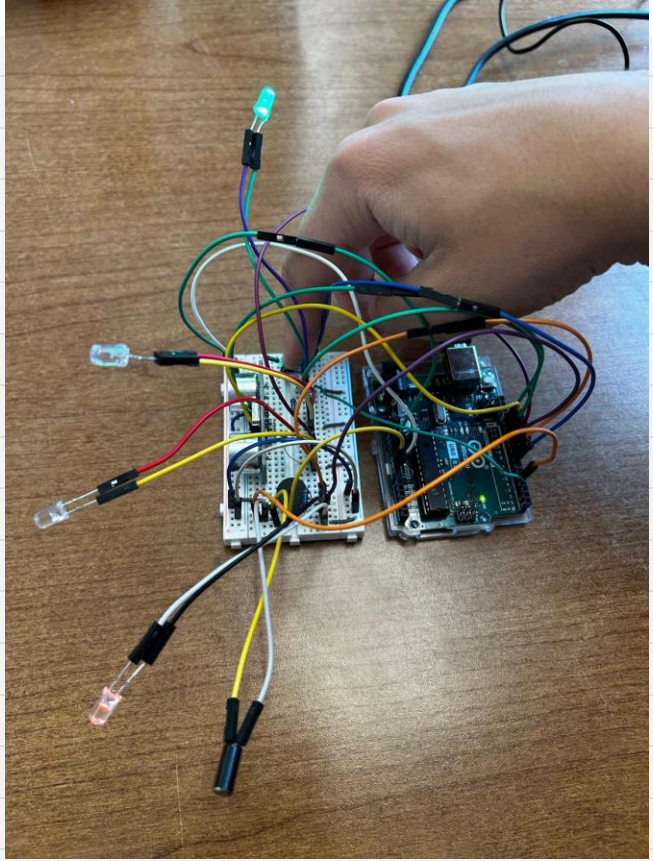
04

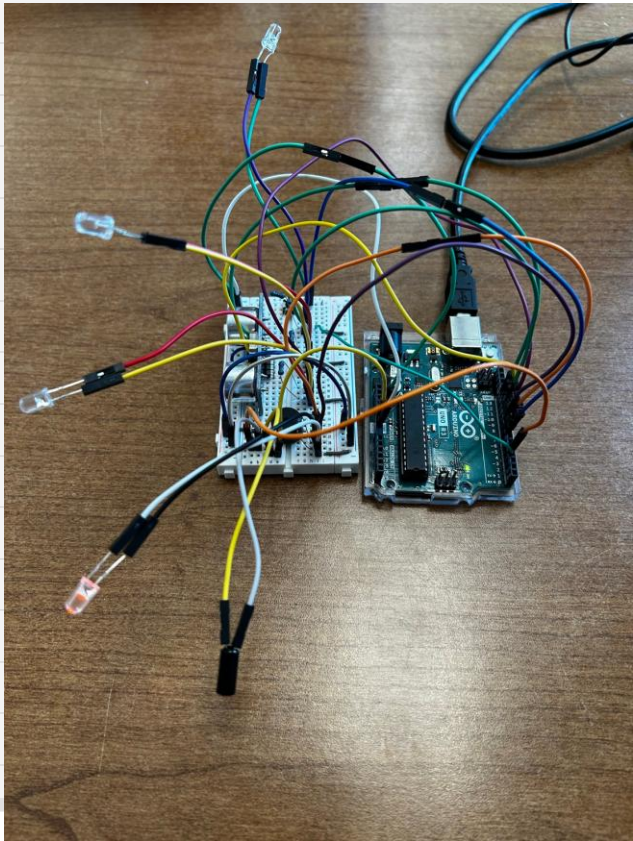
Build Photos





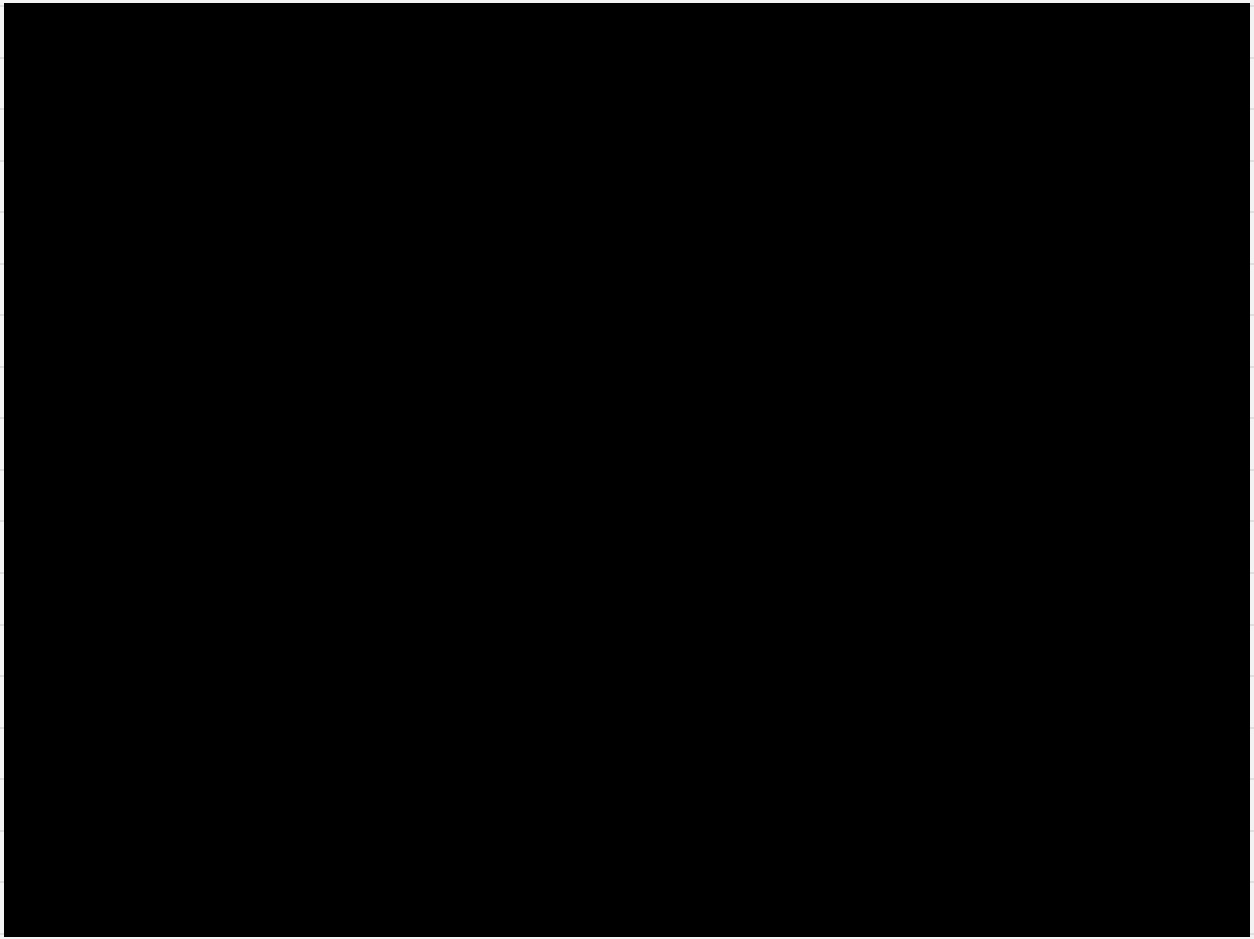






05 Video

Illustration by Smart-Servier Medical Art



Thanks!

CREDITS: This presentation template was created by **Slidesgo**, and includes icons by **Flaticon**, and infographics & images by **Freepik**



Illustration by Smart-Servier Medical Art