GESTURE CONTROLLED AIMING DEVICE

OUR TEAM

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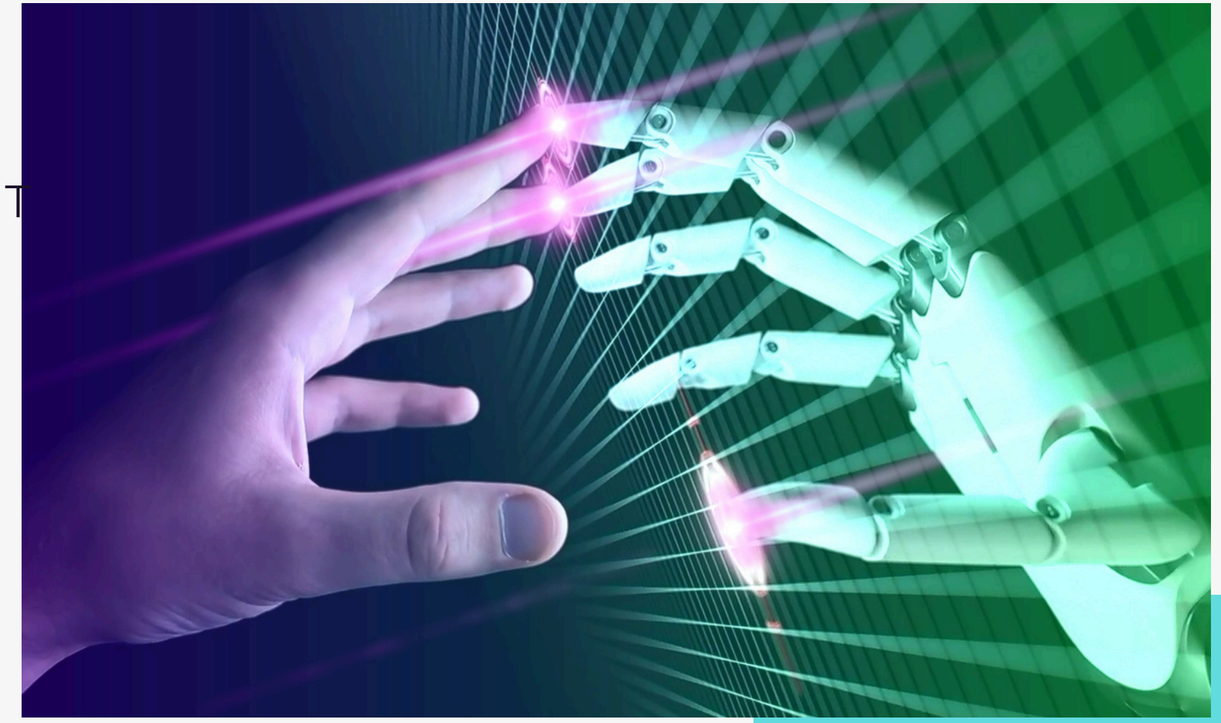


OBJECTIVE

To aim and hit a particular target using a gesture control mechanism.

In this project, our primary purpose is to hit the target(considering that there is no obstacle between the gun and the target) with a bullet just by the mere movement of the hands.

As we are doing this project on a small scale, the intensity of hitting the target is not so high; it is just enough to demonstrate that it shoots perfectly.

REQUIRED RESOURCES

ARDUINO UNO

It is a programmable open-source microcontroller board that can be integrated into a variety of electronic projects.

433 MHz RF Module

The 433 MHz RF transmitter and receiver module is a pair of small RF (i.e. radio-frequency) electronic modules used to send and receive radio signals between any two devices. The transmitter module sends the data from the transmitter end and the Receiver module receives that data at the receiver's end.

ADXL335 Accelerometer

The ADXL335 measures acceleration along X, Y and Z axes and gives analog voltage output proportional to the acceleration along these 3 axes.

REQUIRED RESOURCES

BO MOTOR

Bo motor (Battery Operated) lightweight DC geared motor which gives good torque and rpm at lower voltages.

L293D MOTOR DRIVER

The L293D IC receives signals from the microprocessor and transmits the relative signal to the motors. It has two voltage pins, one of which is used to draw current for the working of the L293D and the other is used to apply voltage to the motors.

Servo motors

Servos are mainly used on angular or linear position and for specific velocity, and acceleration.

BREADBOARD

A breadboard is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate.

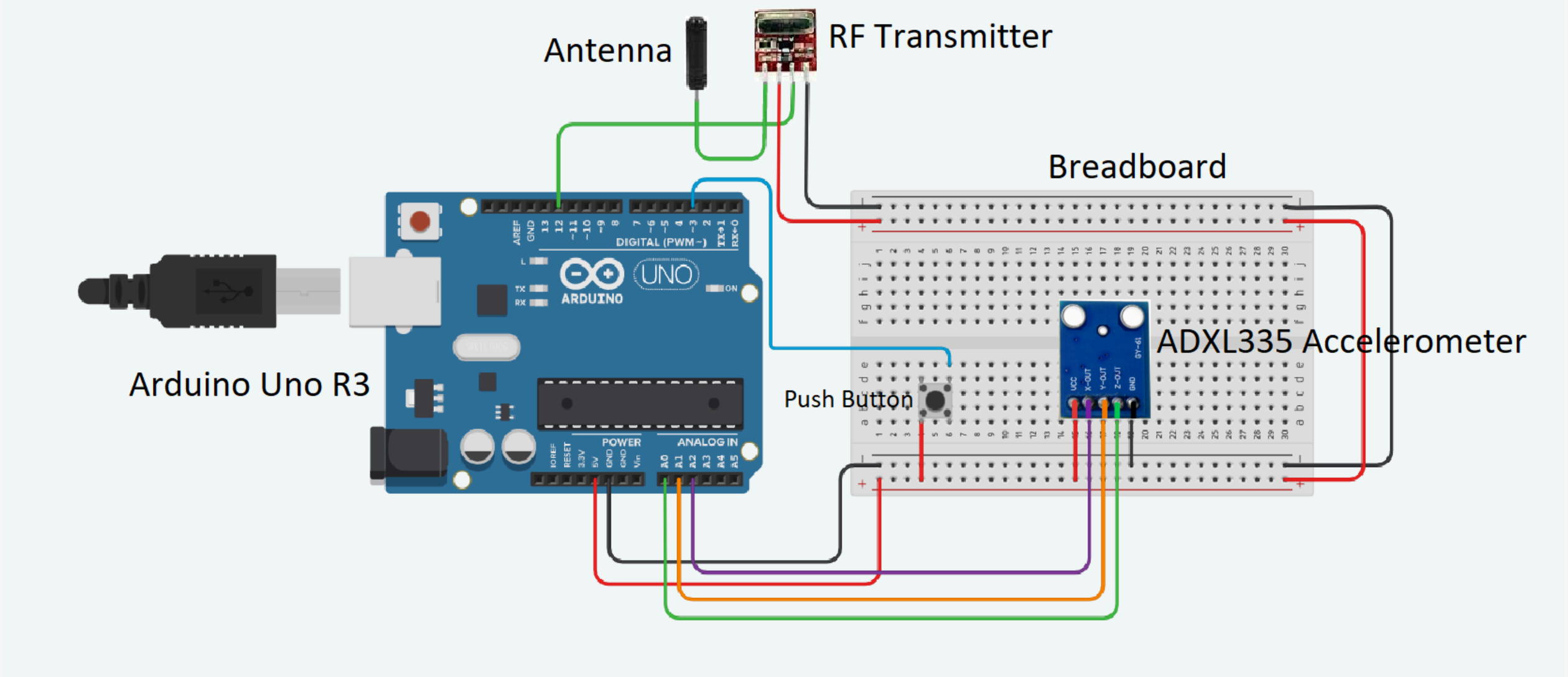
Component	Quantity	Cost
Arduino Uno	2	1724
RF Module	1	222
Servo motors	2	238
L293D motor Driver	1	14
BO Motor	1	65
ADXL Accelerometer	1	510
Breadboard	1	79
TOTAL		2852

SOFTWARES USED

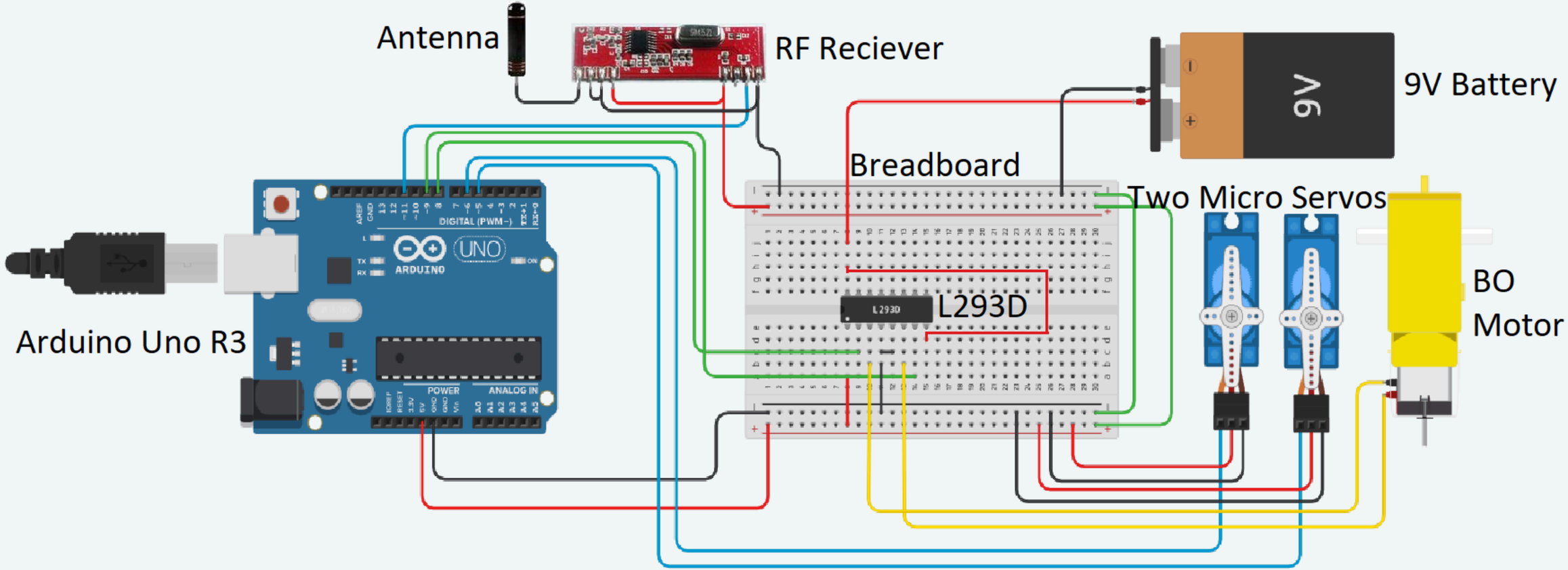
-Tinkercad for the schematic view

-We have used Arduino ide for uploading code

Schematic view : Transmitter



Schematic View : Reciever



SOFTWARE CODE

-At Transmitter

```
#include <RH_ASK.h>
#include <SPI.h>

int state = 0;
RH_ASK driver;

void setup()
{
driver.init();
Serial.begin(9600);
pinMode(3,INPUT);
pinMode(6,INPUT);
}
int x,y,z;
void loop()
{
  x=analogRead(A0);
  y=analogRead(A1);
```

...At transmitter

```
if(x>=370)
 {
 z=0;
 }
 else if(x<=310)
 {
 z=1;
 }
uint16_t data;
 if((x<370)&&(x>310))
 {
 data=y;
 }
 else
 {
 data=1000+z;
 }
 if(digitalRead(3)==LOW)
 {data=1;}
 if(((data>=1000)&&(digitalRead(6)==HIGH))||(data==1))
 {
 driver.send((uint8_t *)&data, sizeof(data));
 driver.waitPacketSent();
 }
 else if(((data<800)&&(digitalRead(6)==LOW))||(data==1))
 {
 driver.send((uint8_t *)&data, sizeof(data));
 driver.waitPacketSent();
 }
else
 {
 data=0;
 driver.send((uint8_t *)&data, sizeof(data));
 driver.waitPacketSent();
 }
 if(data==1)
 {
 delay(100);
 }
 else
 {
 delay(50);
 }
 Serial.println(data);
}
```

SOFTWARE CODE

-At Receiver

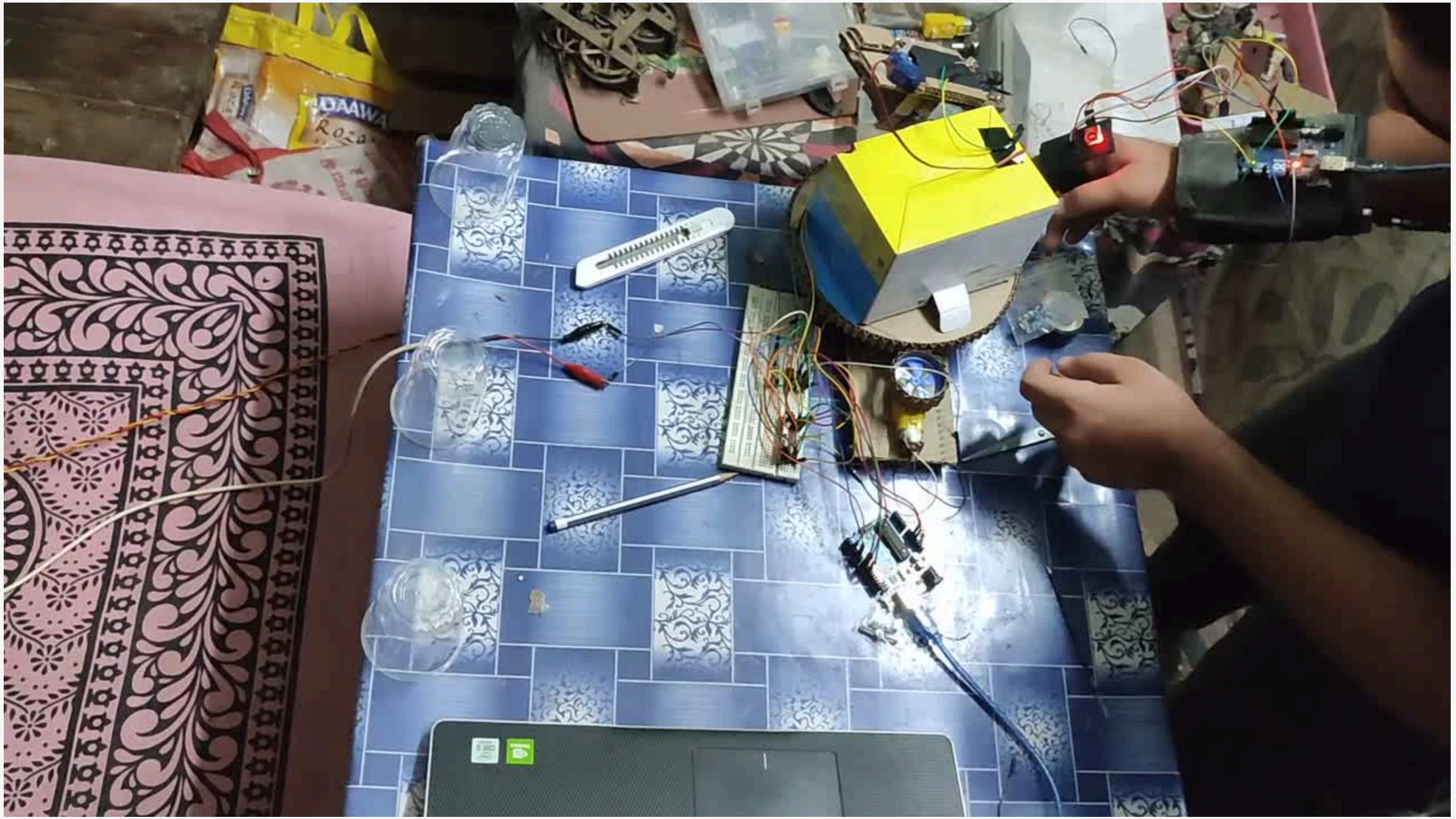
```
#include"ServoTimer2.h"
ServoTimer2 servo1;
ServoTimer2 servo2;
#include <RH_ASK.h>
#include <SPI.h>

RH_ASK driver;
int y;
void setup()
{
  Serial.begin(9600);
  driver.init();
  servo1.attach(6);
  servo2.attach(3);
  y=1750;
}
float x;
```

...At reciever

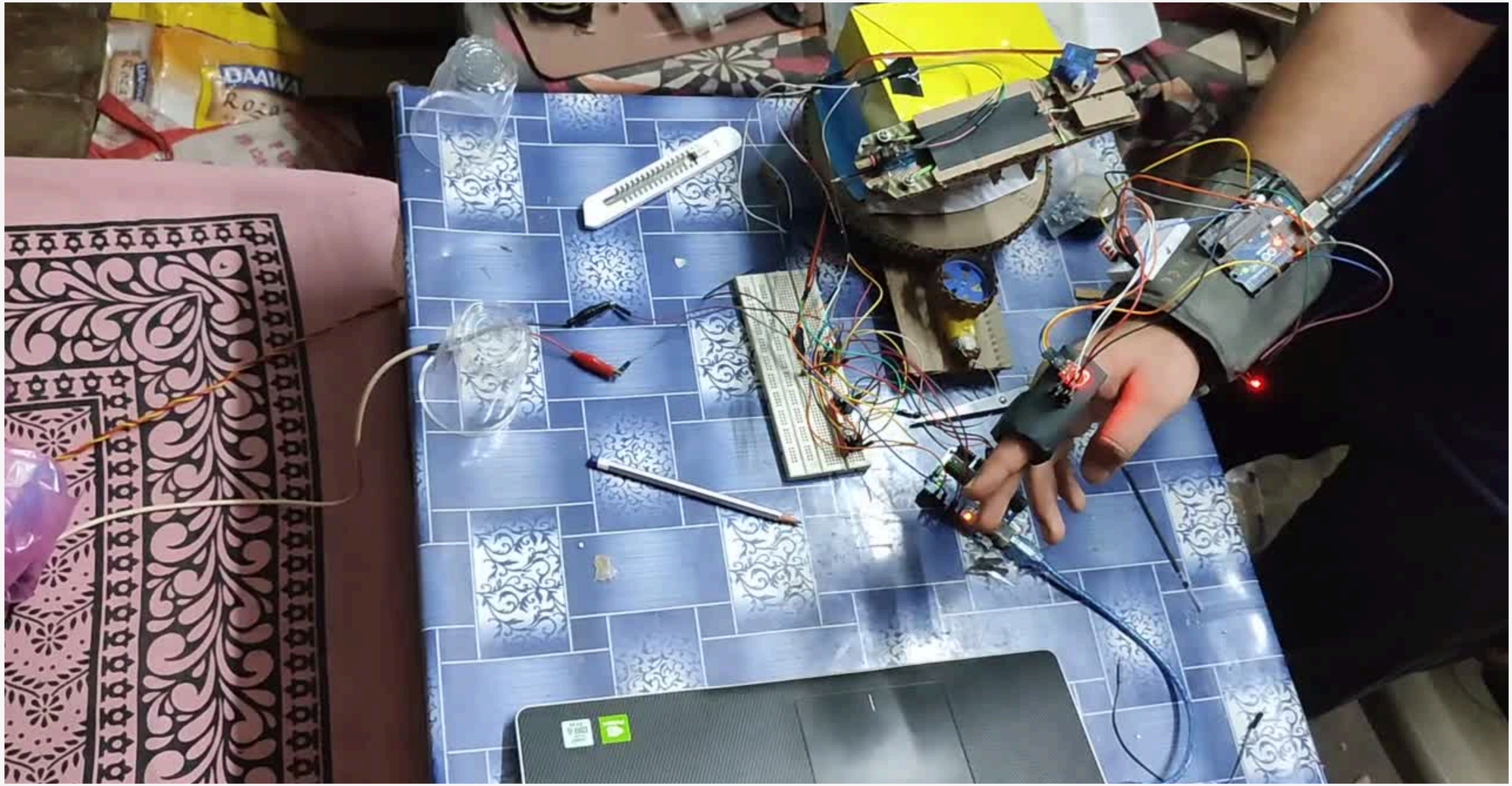
```
int z;
void loop()
{

 uint16_t data;
 uint8_t datalen = sizeof(data);
if (driver.recv((uint8_t*)&data, &datalen))
 {
 Serial.print(data);
 Serial.print(" ");
 x=750+(25.0/3.0)*(data-260);
 if((data<900)&&(data>10))
 {
 y=(int)x;
 }

 Serial.println(y);
 }
 servo1.write(1970+750-y);
 if(data==1)
 {
 servo2.write(750);
 }
 else
 {
 servo2.write(1750);
 }
if(data==1000)
{digitalWrite(8,HIGH);
digitalWrite(9,LOW);}
else if(data==1001)
{
 digitalWrite(9,HIGH);
digitalWrite(8,LOW);
}
else
{
 digitalWrite(9,LOW);
digitalWrite(8,LOW);
}
```

VIDEO EXPLANATION

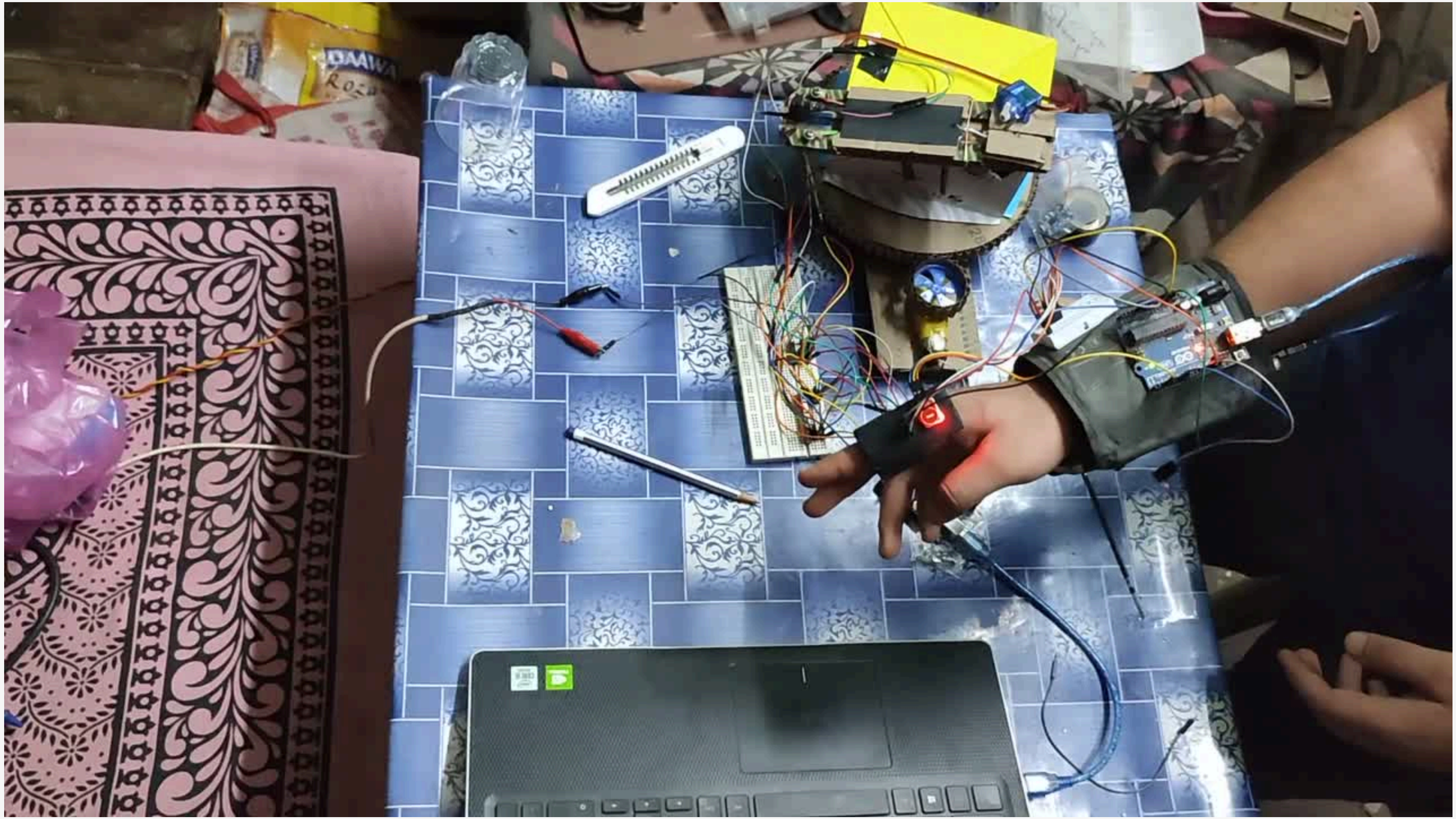
First Shot



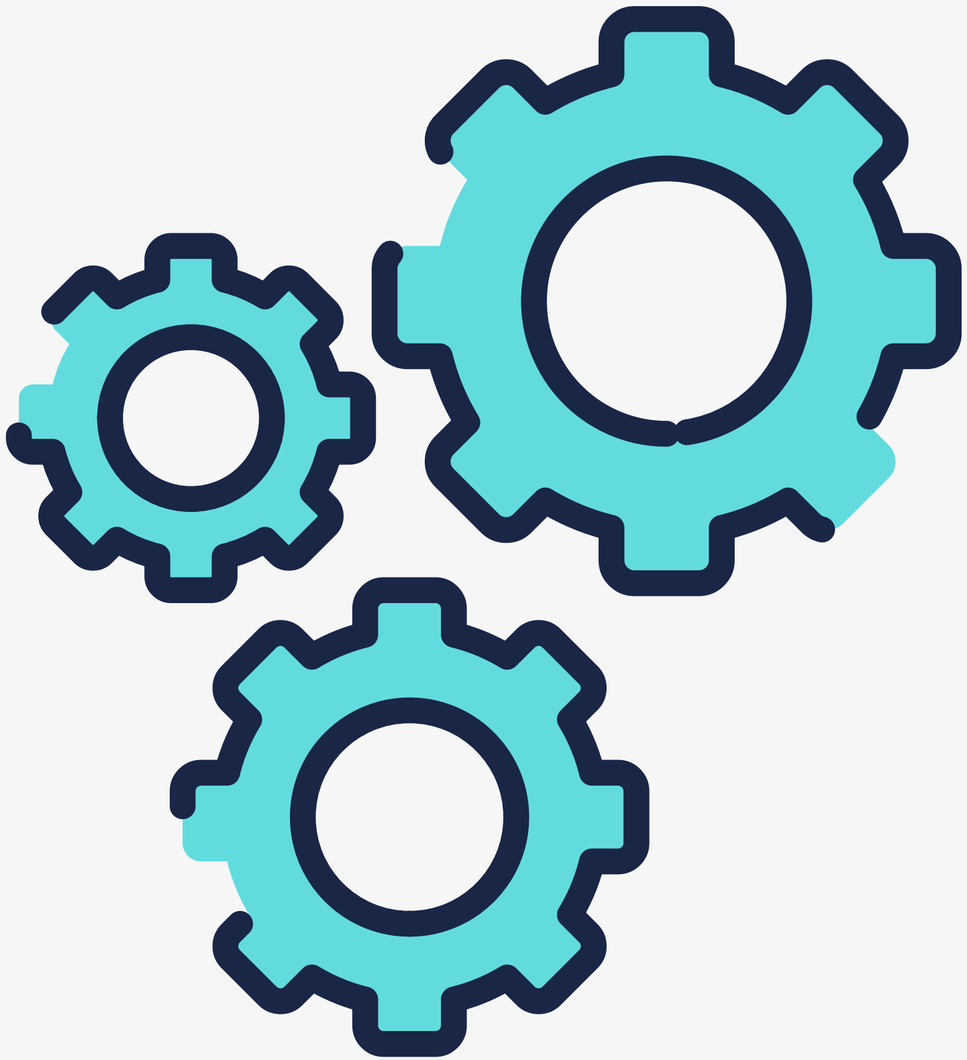
Second Shot

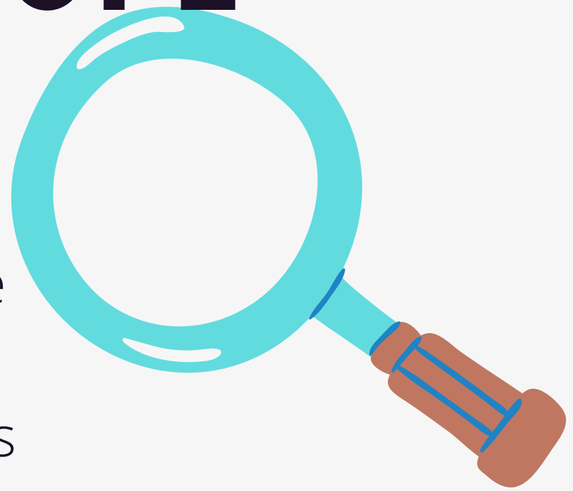


Third Shot



CONCLUSION AND FUTURE SCOPE





Gesture-based interaction provides a new form for people to interact with devices and shows significant breakthroughs in the history of human-computer interaction.

In this domain, still, research is going on. Our model can range up to a maximum distance of 5m. It has an excellent future scope as scientists work to increase its max reach.

CHALLENGES BEING FACED IN THE PROJECT

- **Short Range:** Instead of the RF module, we would have used some other sensors like the HC12 Bluetooth module, or Hobbypower Apc220 we could have got a better range.

- **Weak Structure:** The prototype we made is quite good for acquiring initial and final position however its motion is not very smooth due to its weak structure and also due to sensitivity of the accelerometer that we are using (ADXL335). These problems can be overcomed by using some better sensors and modules .

FLOW-CHART

Finalising the idea and researching the topic.

Preparing a schematic diagram
(Week 1)

Working on the code

Getting all the components and starting the assembling
(Week 2)

Recording the video

Making the report
(Week 3)

Finalising the final Presentation and video
(Week 4)

THANKYOU