



AUTOMATIC HAND SANITIZER DISPENSER

LUMOS TEAM

Supervisors: Dr. Iman Elawady ; ENG. Michael B.Khani

Team LUMOS members:

- Cansel Evli, 1810213083
1810213083@ogrenci.karabuk.edu.tr

- Emine Nur Bardakçı, 1810213033
1810213033@ogrenci.karabuk.edu.tr

- Merve Nur Onan, 2017010213019
mervenuronan@ogrenci.karabuk.edu.tr

- Furkan Dereli, 1910213056
1910213056@ogrenci.karabuk.edu.tr

- Dilara Bakan, 1810213058
1810213058@ogrenci.karabuk.edu.tr

- Amina Khal Murad, 2017710213180
@ogrenci.karabuk.edu.tr

- Abdirisak Abdirahman Yusuf, 1910213552
1910213552@ogrenci.karabuk.edu.tr

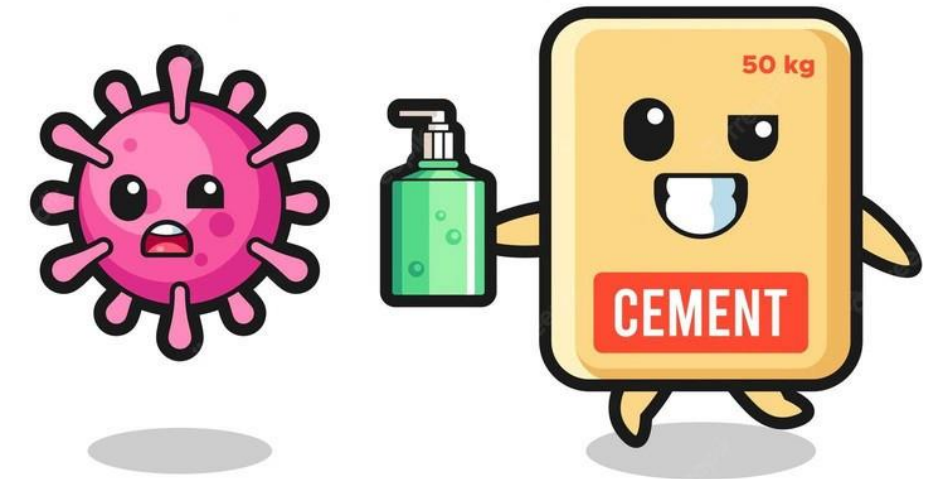


Introduction

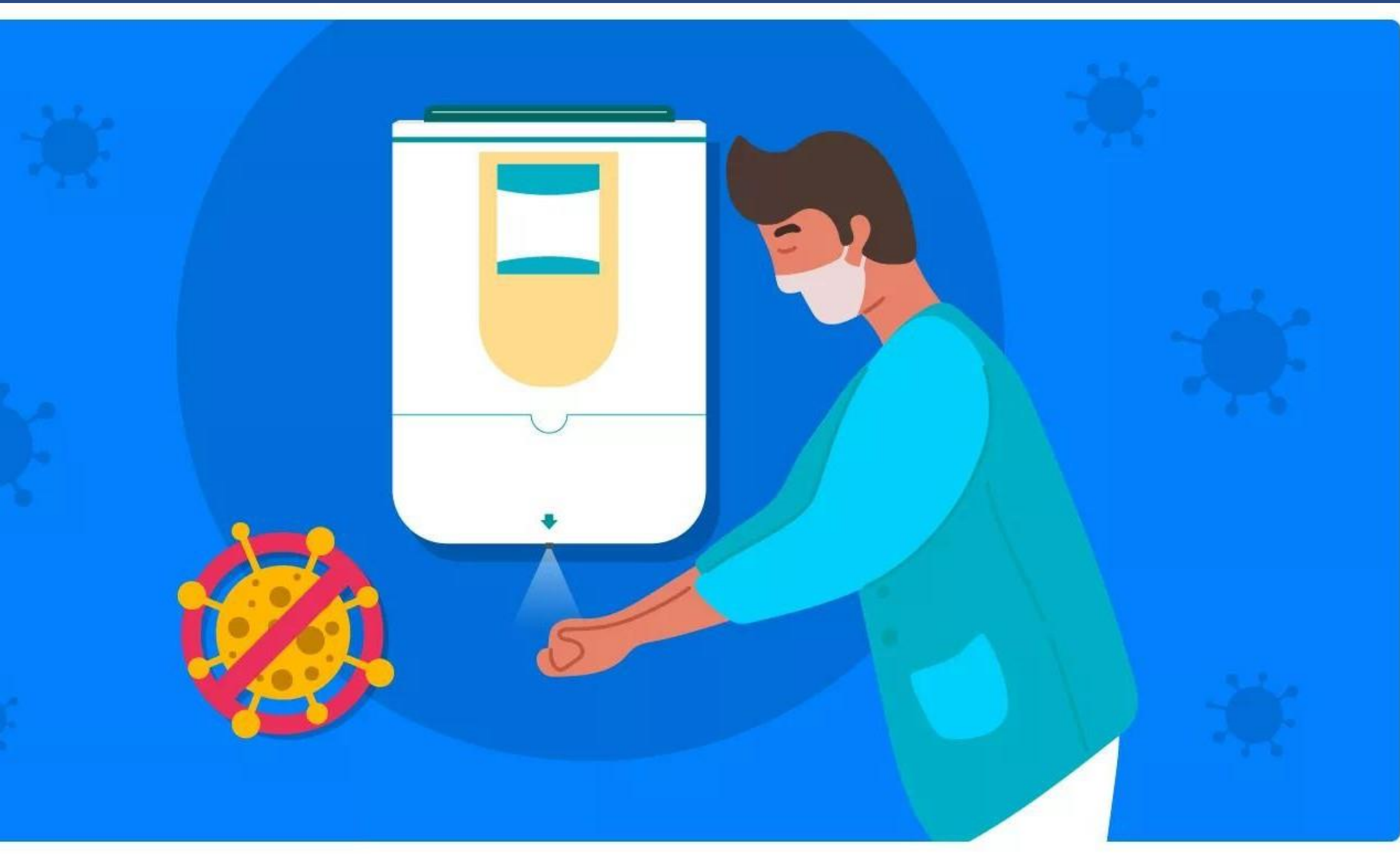
The project aims to enable users to continue their day in a hygienic way at all times in the current global epidemic.

The main part given in the design of the project is to make people's lives easier.

When the project was started to be designed based on this phenomenon, a design was made at hand level by taking the average height of the region where people live. In this way, people who want to disinfect their hands can easily use it by simply placing their hands under the disinfectant.



Goals:



- **Hygiene**
- **Ease of Use**
- **Practical**
- **Energy-saving**

What our device does and how it works?

As the hands are inserted into the hand compartment of the hand sanitizer,

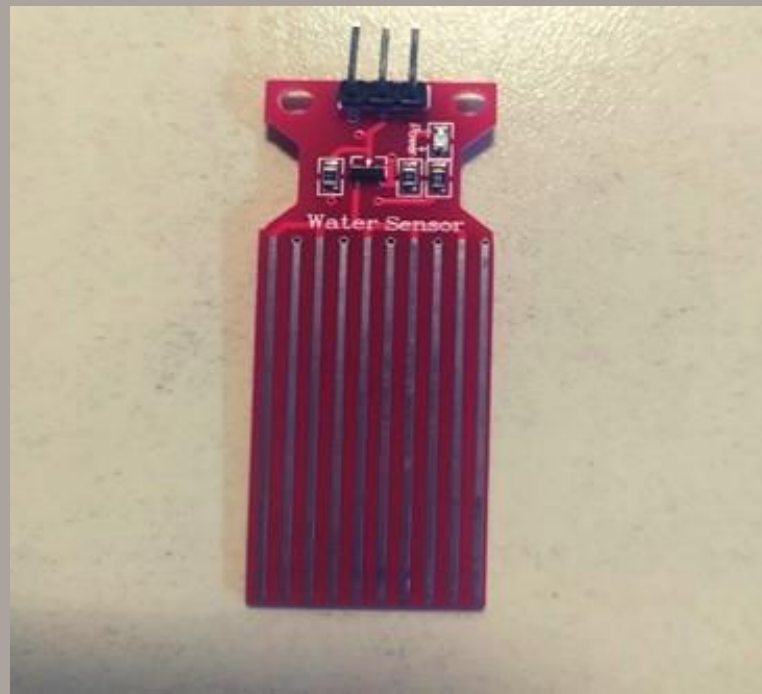
sensors in the hand compartment detect the hands and begin to spray the antibacterial sanitizer.

With this process, 99% of bacteria and microbes on the hand are destroyed.

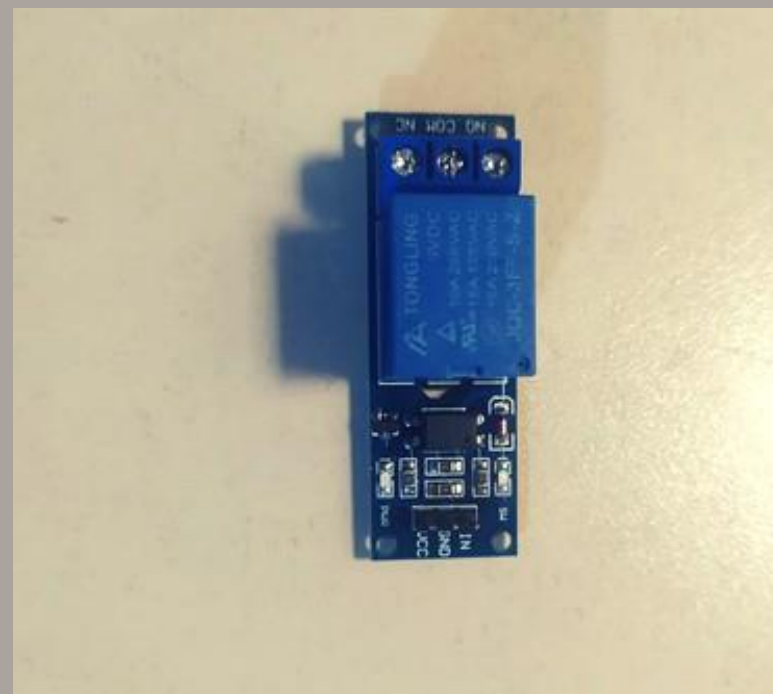
Related Works

Related Works

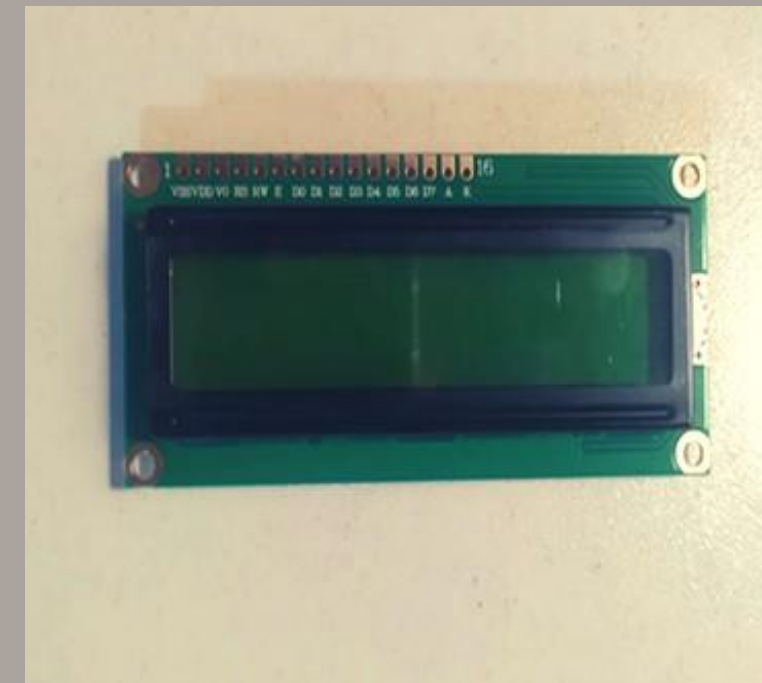
A summary of the available devices and solutions :



water sensor



relay module



16*2 lcd display

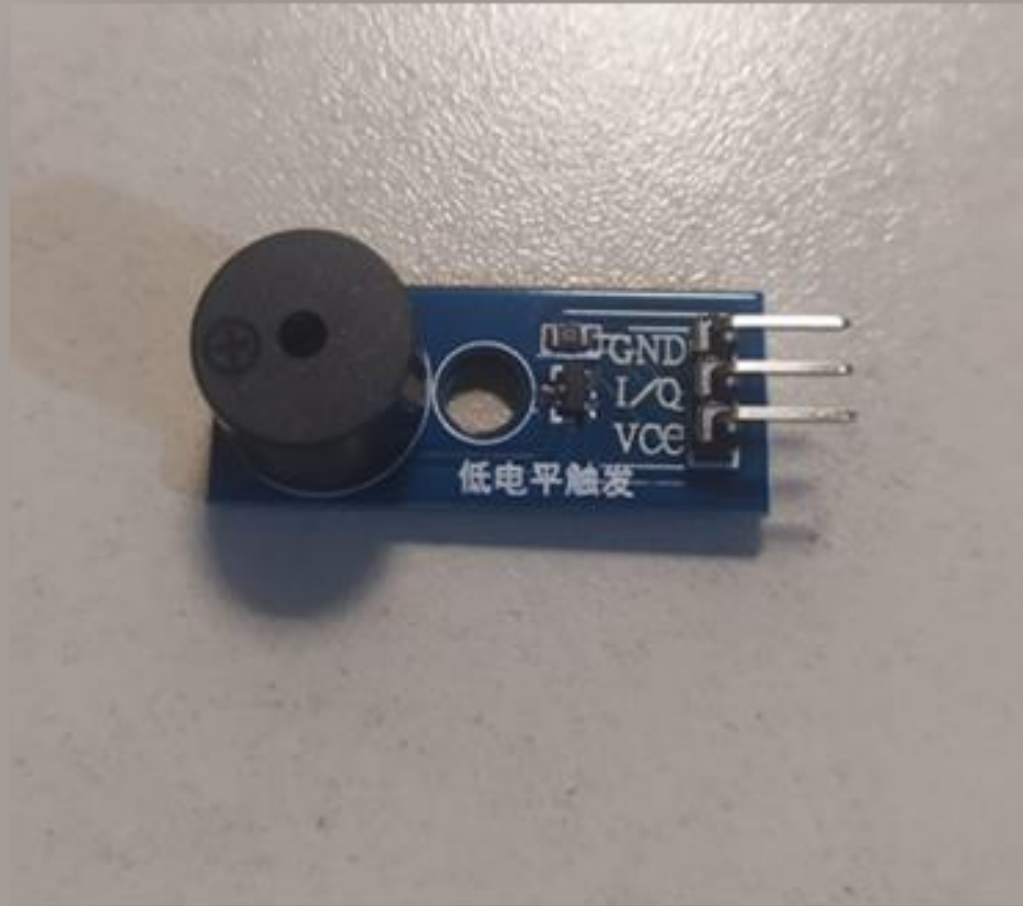


ultrasonic sensor

Related Works



esp32 dev module

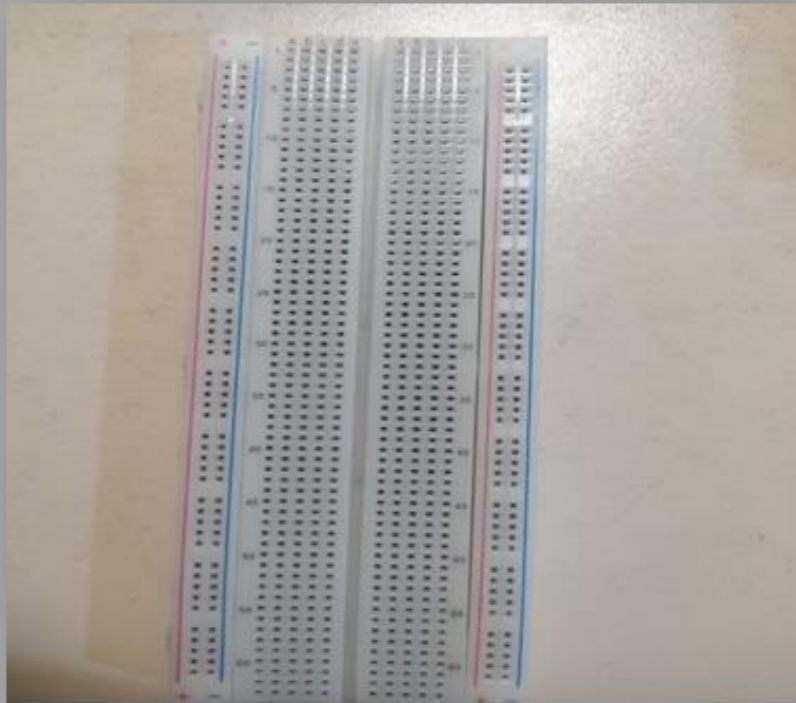


buzzer



mini dc submersible pump

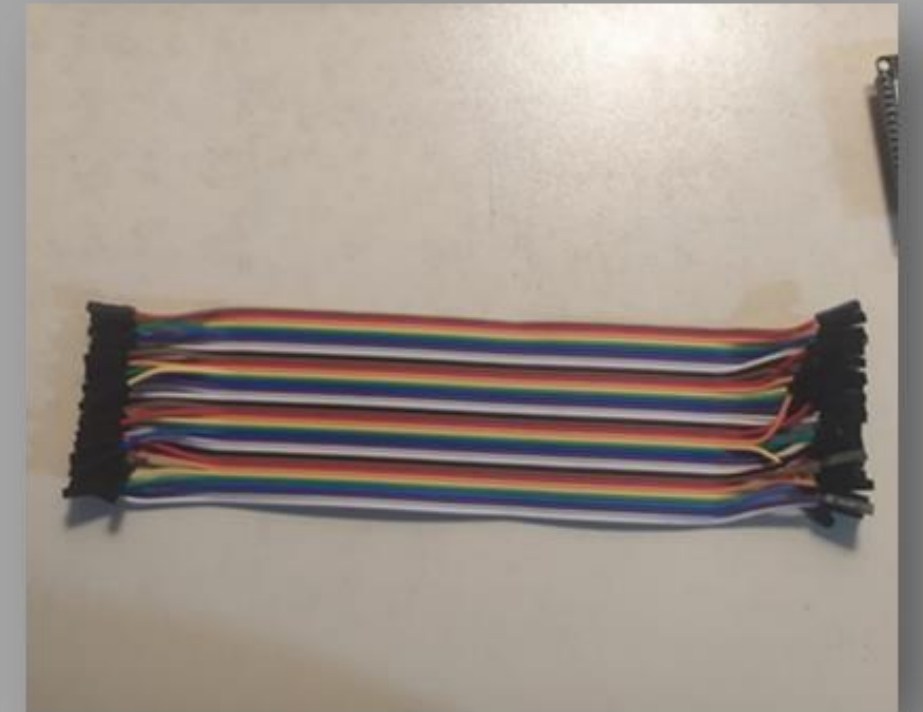
Related Works



breadboard



male-to-female jumper



female-to-female jumper

Active High.	EN	pin15
ADC1_CH0	SENSOR_VP	GPI036 pin14
ADC1_CH3	SENSOR_VN	GPI039 pin13
ADC1_CH6	VDET1	GPI034 pin12
ADC1_CH7	VDET2	GPI035 pin11
ADC1_CH4		GPI032 pin10
ADC1_CH5		GPI033 pin9
ADC2_CH8	EMAC_RXD0	GPI025 pin8
ADC2_CH9	EMAC_RXD1	GPI026 pin7
ADC2_CH7	EMAC_RX_DV	GPI027 pin6
ADC2_CH6	EMAC_TXD2	GPI014 pin5
ADC2_CH5	EMAC_TXD3	GPI012 pin4
ADC2_CH4	EMAC_RX_ER	GPI013 pin3
	GND	pin2
	VIN	pin1



pin15	GPI023	SPI_MOSI
pin14	GPI022	EMAC_TXD1 U0RTS
pin13	GPI01	EMAC_RXD2 U0TXD
pin12	GPI03	U0RXD
pin11	GPI021	EMAC_TX_EN
pin10	GPI019	EMAC_TXD0 U0CTS
pin9	GPI018	SPI_CLK
pin8	GPI05	EMAC_RX_CLK SPI_CS0
pin7	GPI017	EMAC_CLKOUT180 U2_TXD
pin6	GPI016	EMAC_CLKOUT U2_RXD
pin5	GPI04	EMAC_TX_ER ADC2_CH0
pin4	GPI02	ADC2_CH1
pin3	GPI015	EMAC_RXD3 ADC2_CH2
pin2	GND	
pin1	VDD 3V3	

RELATED WORKS

- POWER AND CONTROL SYSTEMS
- FIGURE 5.1

RELATED WORKS

❖ POWER AND CONTROL SYSTEMS

- ❖ Esp 32 programmed with microphyton was used in the project. The pins of the esp32 used are as shown in figure 5.1.
- ❖ Communication between esp 32 and other parts was provided by uart protocol. The power required for the operation of the esp 32 was provided by the selected 9v battery. Since the operating voltage of the pins of the microcontroller is 3.3v, voltage value ranges suitable for ESP were obtained by using converters where necessary.



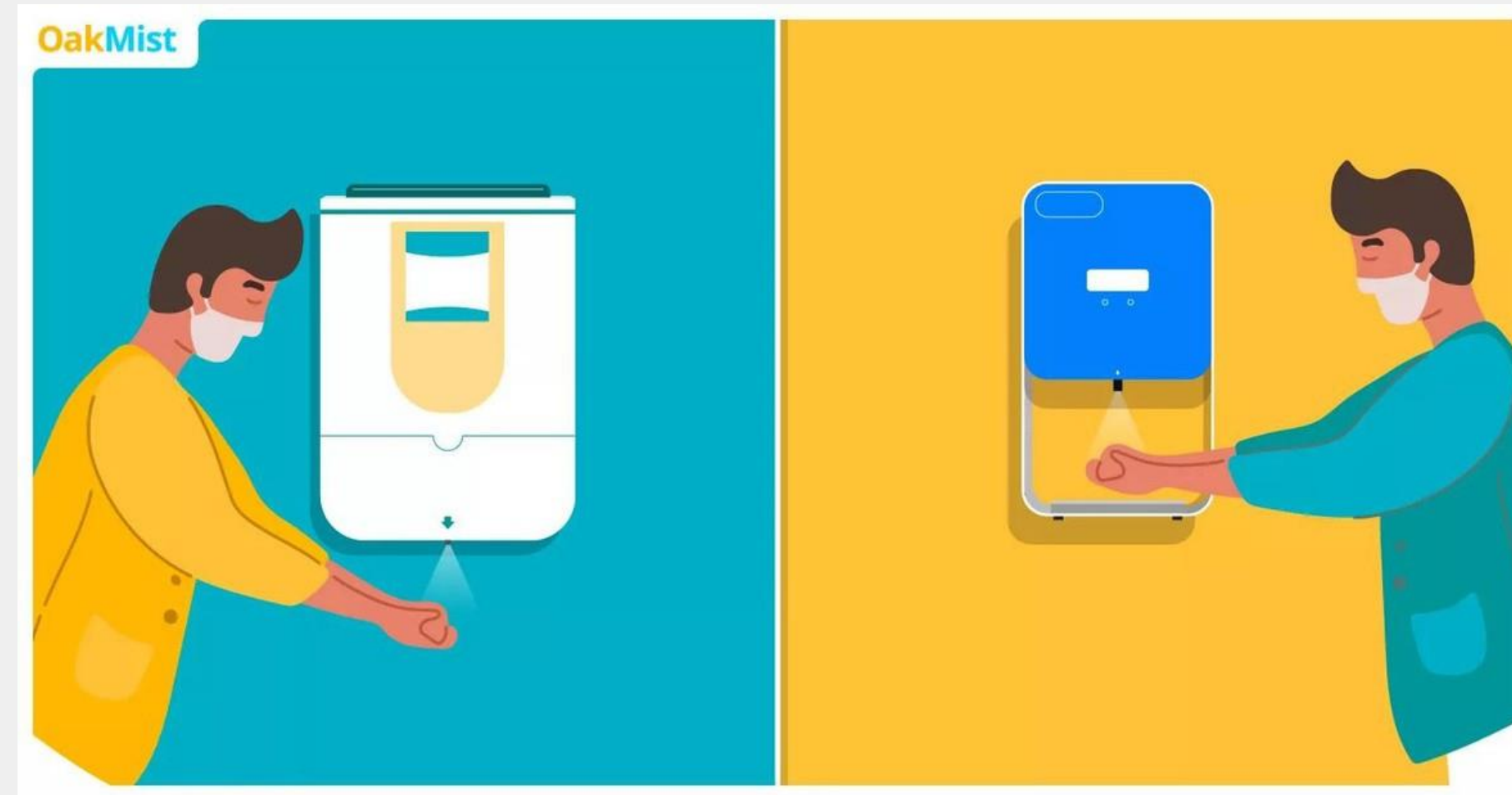
- **WHY AND HOW THE PROBLEM YOU'RE TRYING TO SOLVE IS IMPORTANT?**

The hand disinfectant machine, which is one of the preferred vending machines in order to get away from the effect of covid-19 and to live in a healthier environment, has been prepared for people's need to get rid of bacteria. One of the distinguishing features of vending machines, which are preferred in order to live in hygienic environments and prevent the virus from penetrating our body and risking our lives, is that it reduces contact as much as possible and brings our hands to a more hygienic consistency.

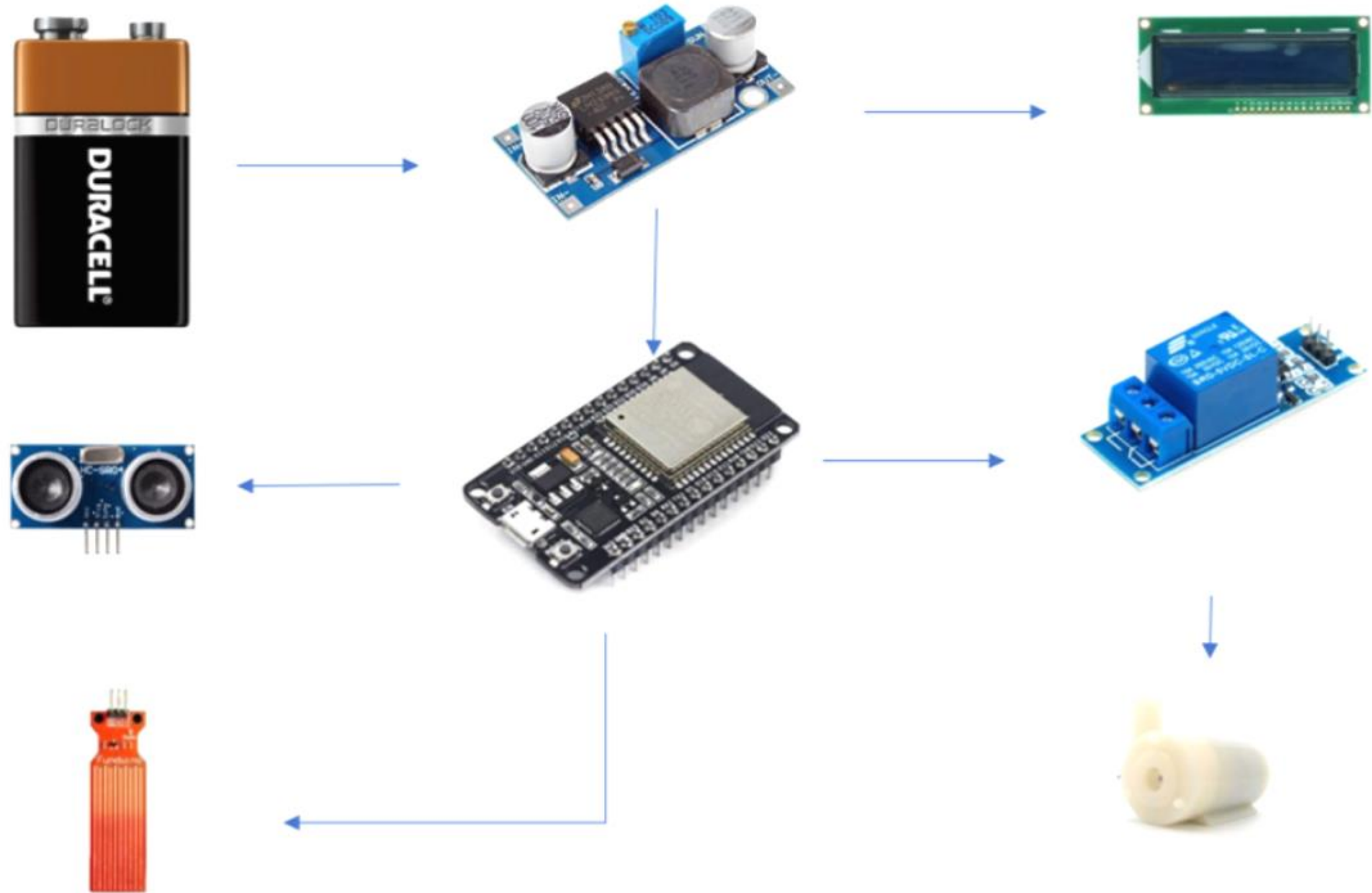


How the project you're presenting is going to (help to) solve the problem?

Although it is necessary to use disinfectant in order to protect ourselves from the effects of the virus, which suddenly enters our lives and leaves us almost helpless, disinfectant that is not used correctly can put us at risk rather than protect us. With the hand disinfectant machine developed in this area, you will be protected from the virus with applications that will make your life easier and will not put your life at risk.



PROJECT DESIGN



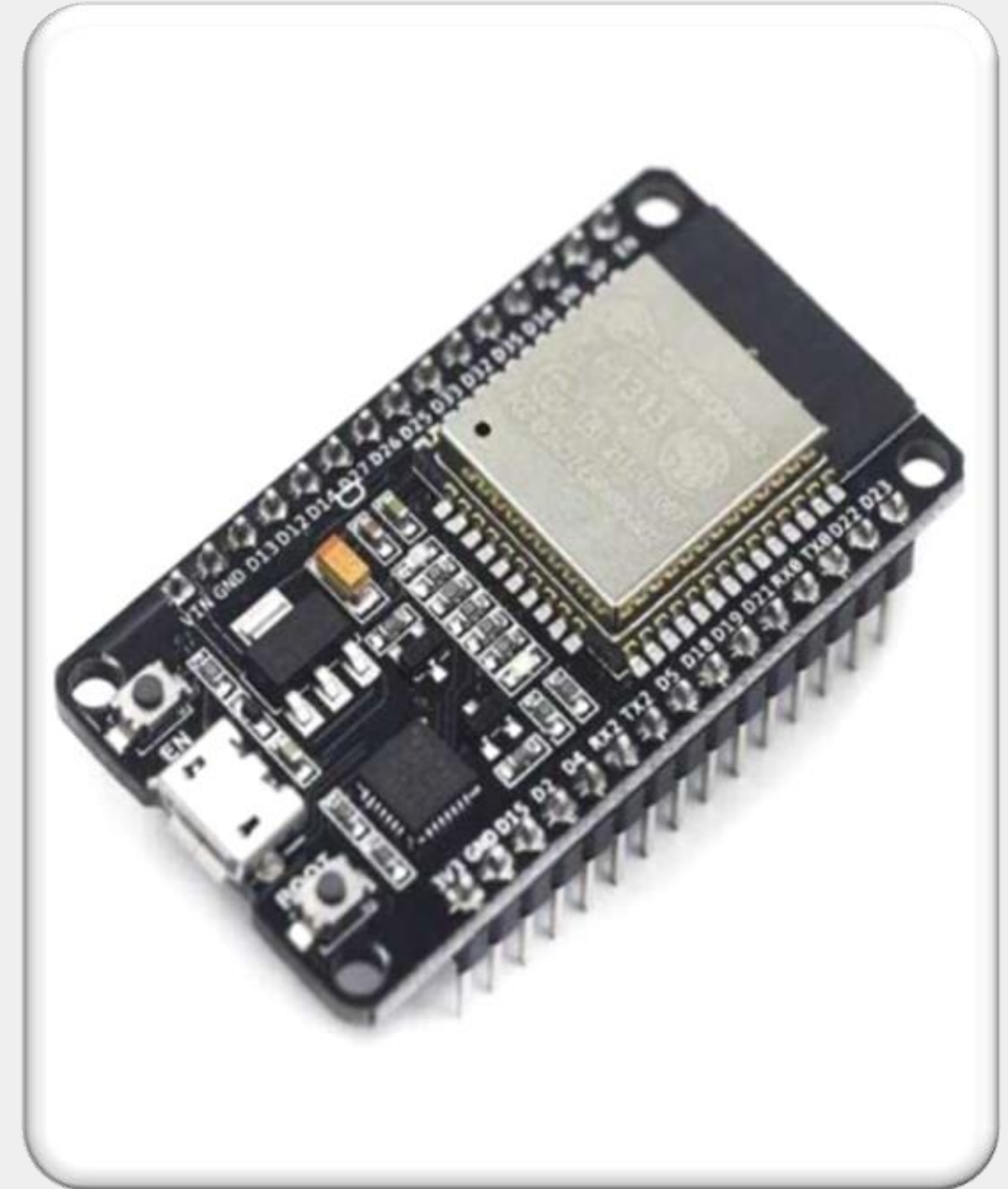
ESP32	ULTRASONİK SENSÖR	LCD EKRAN	BUZZER	POMPA	RÖLE	SU SENSÖRÜ
GND	GND	VSS RW K	GND	-	GND	-
5V		VDD	VCC	+		+
D22		RS				
D4		E				
D15		D4				
D13		D5				
D26		D6				
D21		D7				
VİN	VCC				IN	
D5	TRIG					
D18	ECHO					
D19					VCC	
D33						S
D32			I/O			
3.3V		A				

PROJECT DESIGN

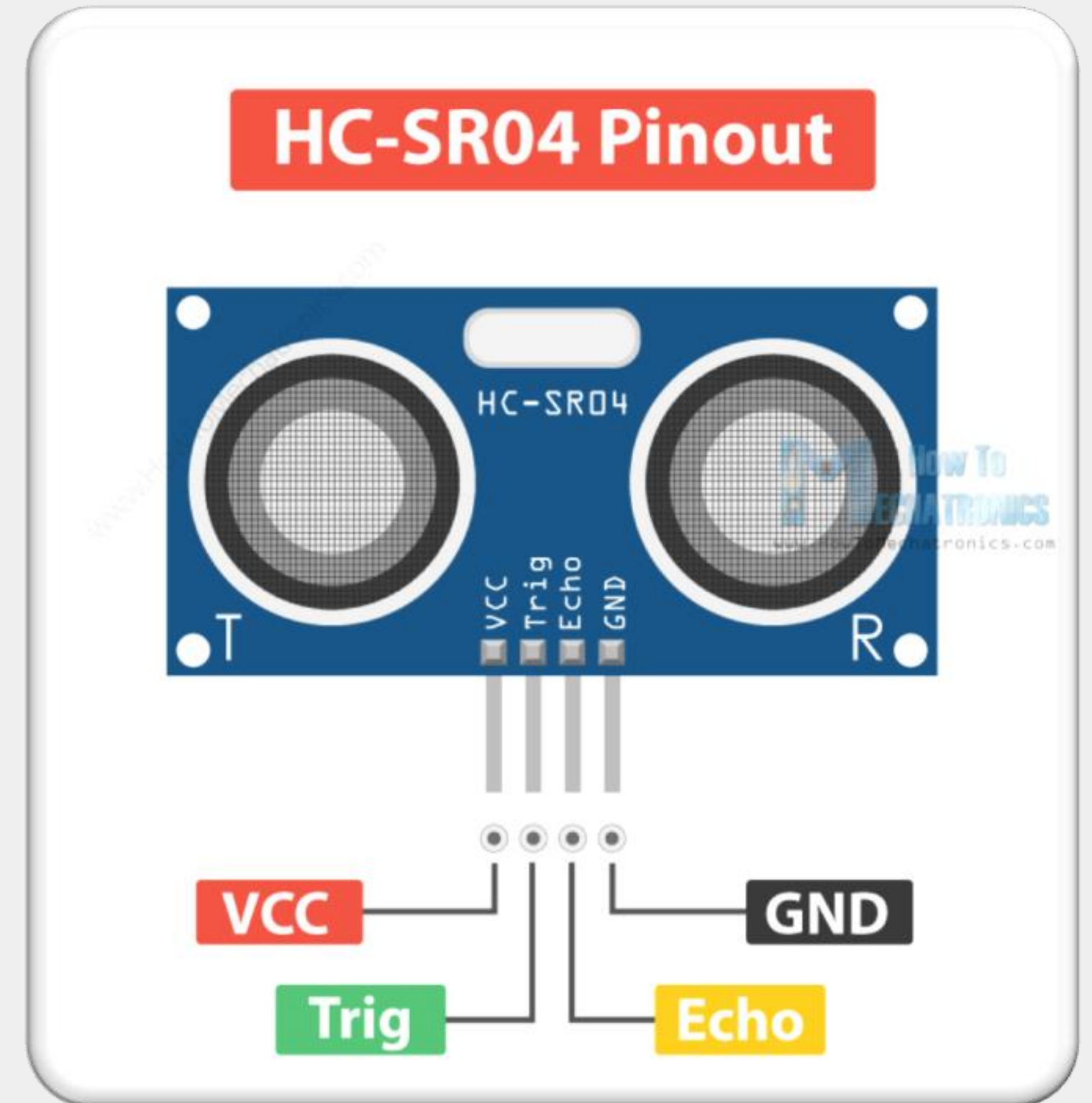
PROJECT DESIGN

- **A SUMMARY OF THE HARDWARE BEING USED, INCLUDING THE EMBEDDED BOARD**

The project, which is designed for the user to disinfect their hands at any time without touching them, includes the necessary sensors for the user to use the system more comfortably. First of all, the power taken from the battery is transmitted to the converter, which is used as a voltage reducer to decrease the voltage, the power from the converter is transferred to the esp 32 used as the processor, then the other circuit elements connected to the esp 32 are fed by the esp 32.



- When the ultrasonic sensor, which can measure in the range of 2cm-4m, detects an object, it transmits it to the esp. Then, thanks to the code in the microcontroller, the engine is drawn for a certain period of time and the liquid is released out. When the water level decreases, the signal sent to the esp32 by the water sensor is processed and transmitted to the buzzer. In this way, it is easier to understand that the disinfectant in the reservoir has run out and needs to be refilled.



PROJECT DESIGN

A summary of the software system (if applicable) and the programming language you used, and why.

*We used Arduino and Micropython. But micropython ones doesn't work so we gave up on micropython codes.

*We used Arduino because it has so many examples and libraries. It's easy to find sources.

*We used Micropython because It's a new technology and we kinda have to use it for lesson.

- **HARDWARE LIMITS: DESCRIBE ANY POWER CONCERNS**

- We used battery for power source. but battery will run out of power so the circuit won't work.
- There is another concern for the project. we used voltage converter cause of the battery. our battery is 9 volt but we needed 5 and 3.3 volts for the esp32 and sensors. so it's a bit risky because of the converter. we always control the converter so we don't burn the esp32.



PROJECT DESIGN

Software limits: describe any real time constraints, security concerns, and code density concerns

*We couldn't work some sensors so our sistem haven't comleted yet. Maybe some sensors were damaged when they arrive to us.

*Right now codes aren't working for some sensors. But in simulation, code are working perfectly fine. So we could use the wrong pins dor the codes or some of the sensors were damaged.

*mini dc water pump, buzzer, water level sensor, ultrasonic sensor are working perfectly fine. But we couldn't do the same for LCD display. LCD aren't working.

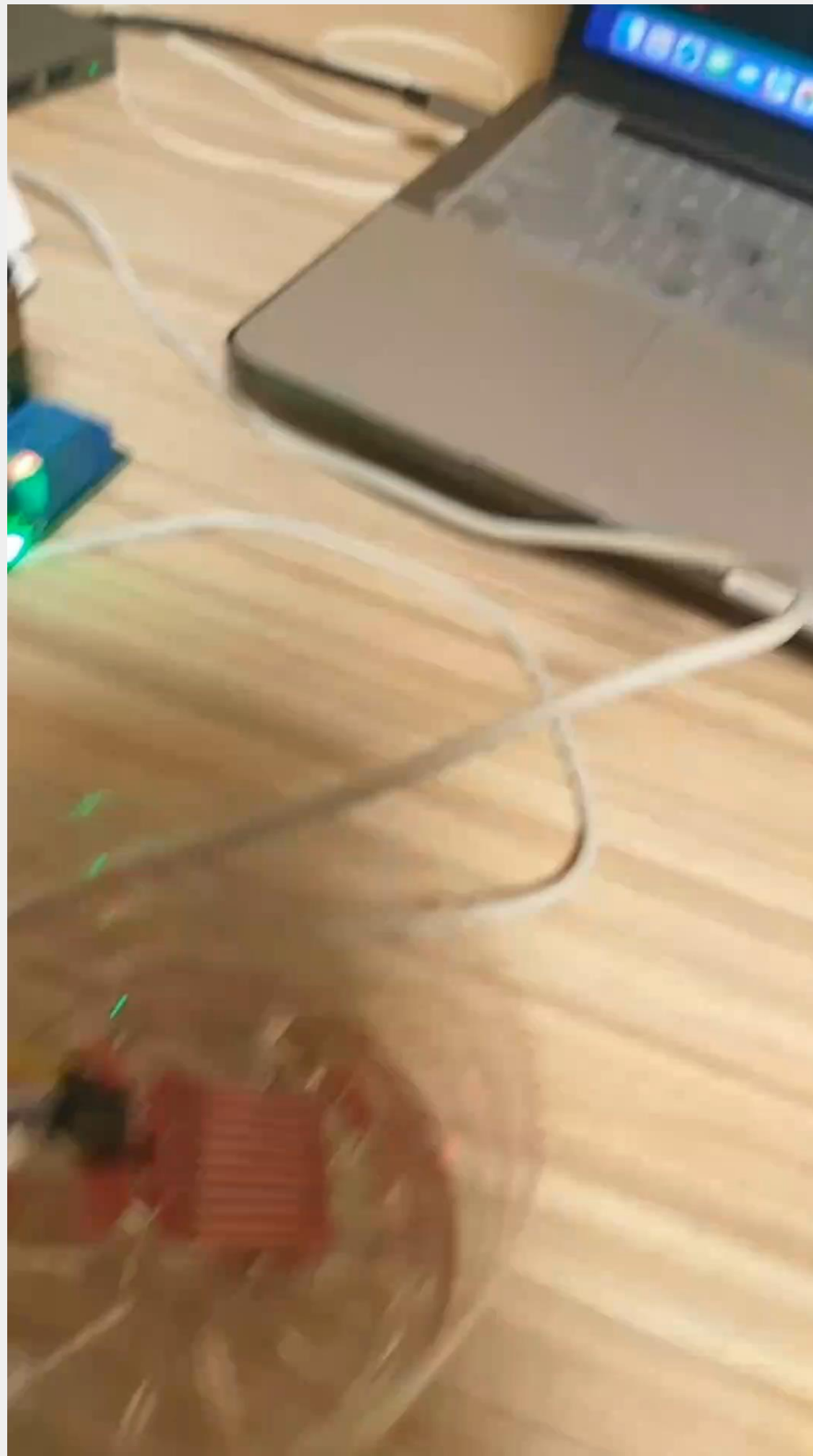
Conclusion

Future work: things you might add or change if you had more time.

We want to add leds to look good.

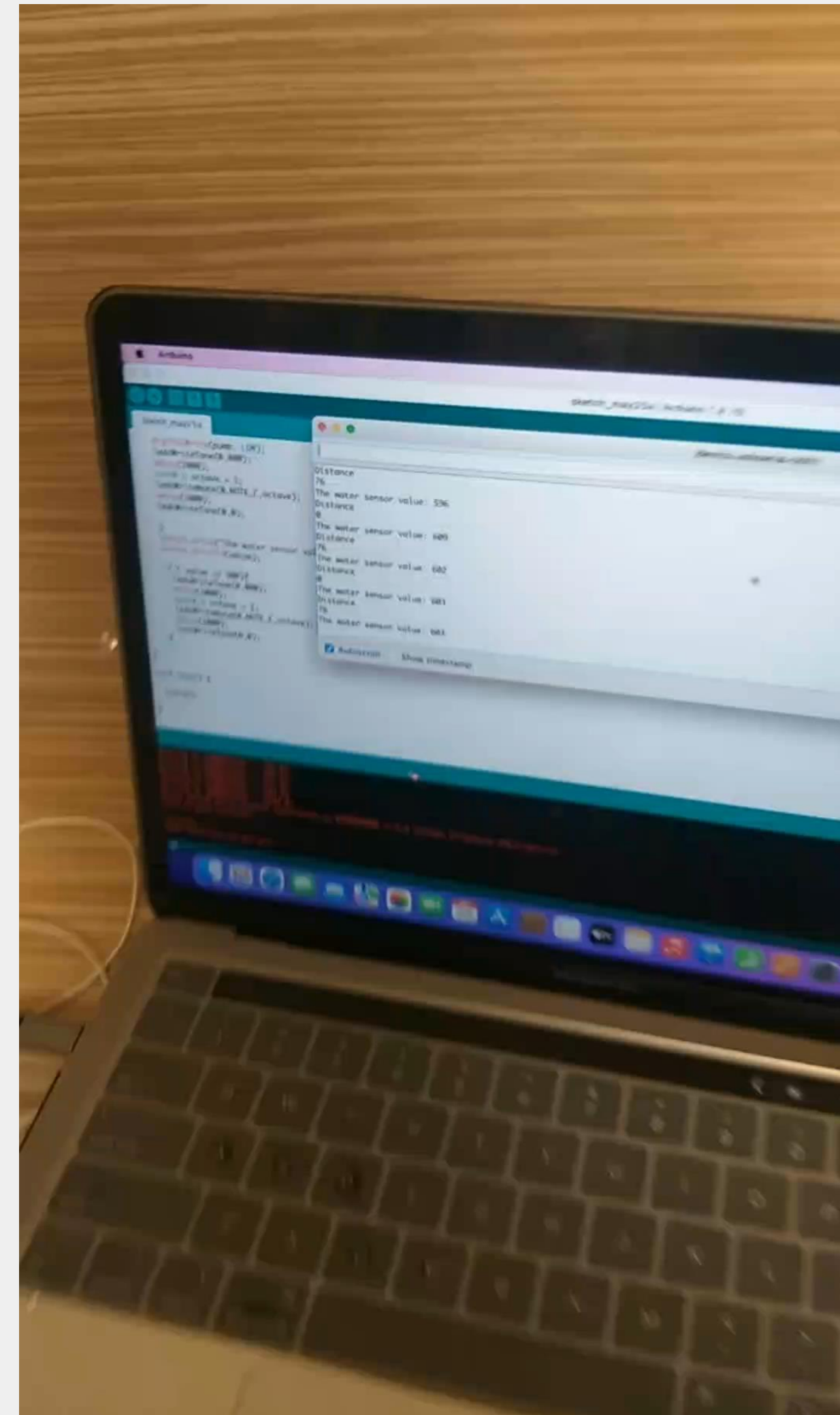
If we had enough money we would use 3-D printer, like this, it would look more organized.

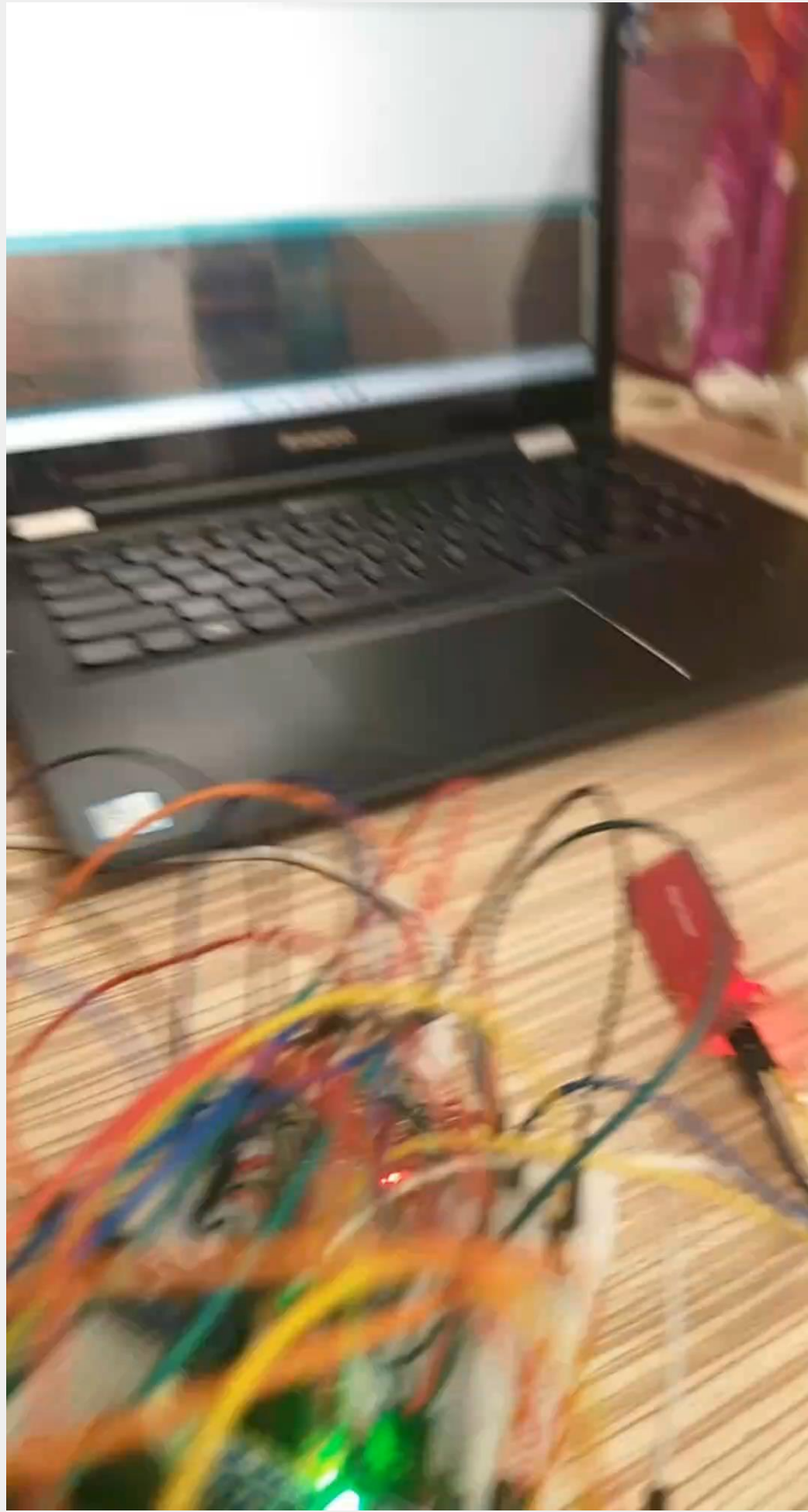
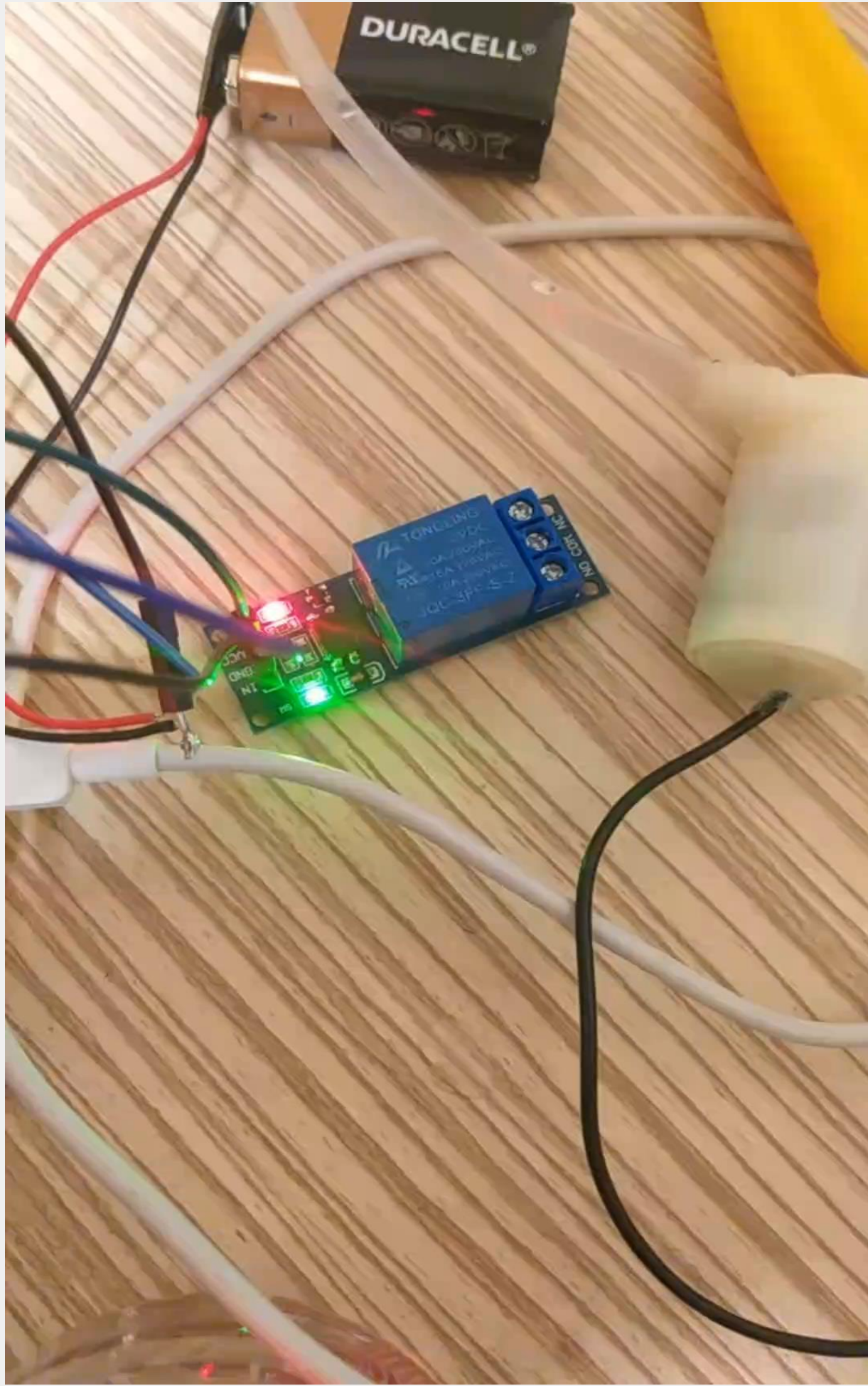
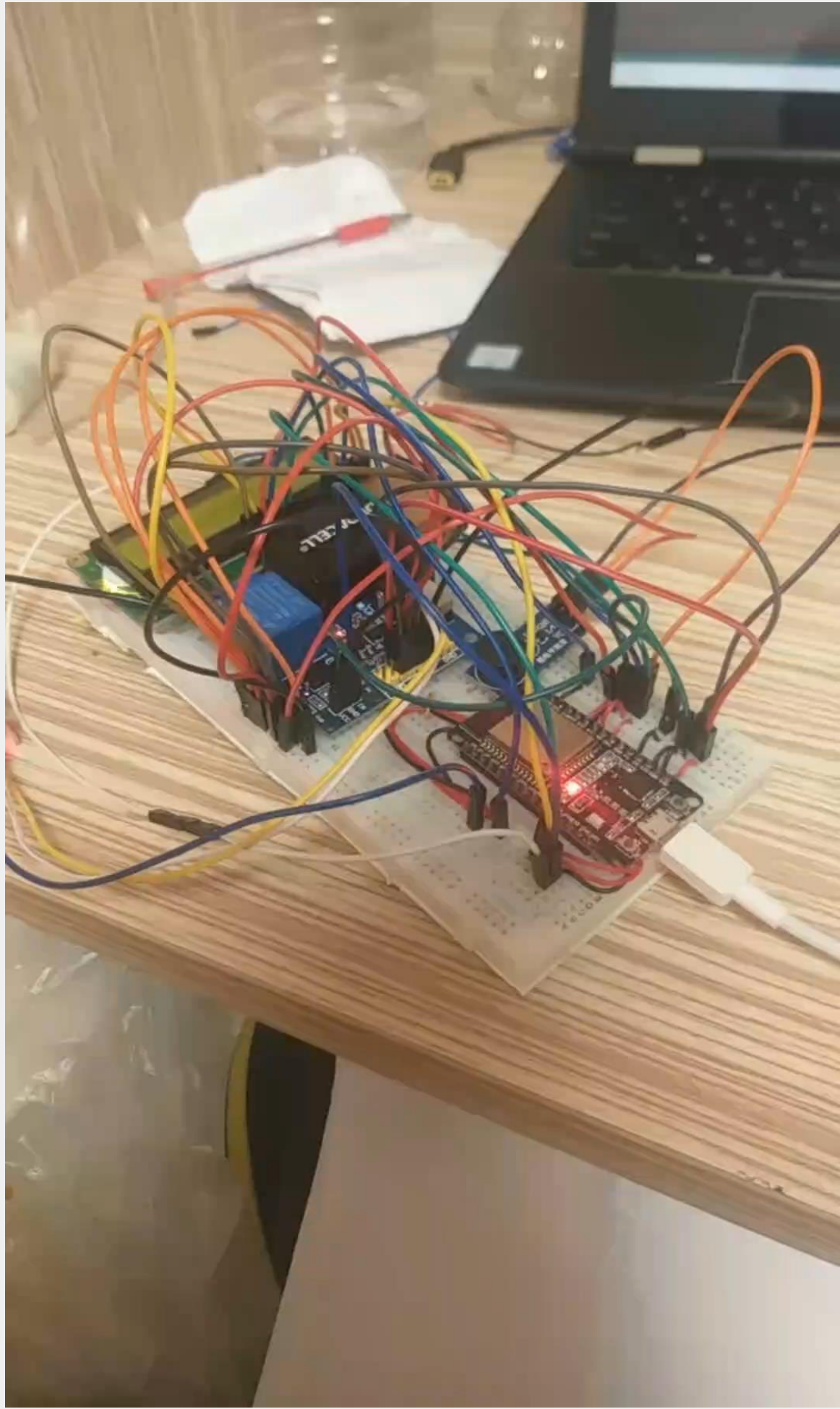
We could find a better container.



CONCLUSION

- LEAVE TIME TO DO A BRIEF DEMO OF THE HARDWARE.





CODES

```
#include <LiquidCrystal.h>
```

```
#define SIGNAL_PIN 33
```

```
#define RELAY_PIN 21
```

```
const int rs = 22, en = 4, d4 = 15, d5 = 13, d6 = 26, d7 = 21;
```

```
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
```

```
const int trigPin = 5;
```

```
const int echoPin = 18;
```

```
long duration;
```

```
int distance;
```

```
int value = 0;
```

```
int value = 0;
```

```
void setup() {
```

```
  Serial.begin(9600);
```

```
  delay(2000);
```

```
  pinMode(trigPin, OUTPUT);
```

```
  pinMode(echoPin, INPUT);
```

```
  pinMode(RELAY_PIN, OUTPUT);
```

```
  digitalWrite(RELAY_PIN, LOW);
```

```
  ledcSetup(0,1E5,12);
```

```
  ledcAttachPin(32,0);
```

```
  lcd.begin(16, 2);
```

```
  lcd.clear();
```

```
  lcd.setCursor(0,0);
```

```
  lcd.print("Covid19 Tracker");
```

```
  lcd.setCursor(0,1);
```

```
  lcd.print("Hand Sanitizer");
```

```
}
```

```
void ultra(){
```

```
  digitalWrite(trigPin, LOW);
```

```
  delayMicroseconds(2);
```

```
  digitalWrite(trigPin, HIGH);
```

```
  delayMicroseconds(10);
```

```
  digitalWrite(trigPin, LOW);
```



```
duration = pulseIn(echoPin, HIGH);

distance = duration * 0.0340 / 2;

Serial.println("Distance");

Serial.println(distance);

digitalWrite(RELAY_PIN, HIGH); // turn the sensor ON

delay(10);           // wait 10 milliseconds

value = analogRead(SIGNAL_PIN); // read the analog value from sensor

digitalWrite(RELAY_PIN, LOW); // turn the sensor OFF

if (distance > 1 && distance <= 15){

    ledcWriteTone(0,800);

    delay(2000);

    uint8_t octave = 1;

    ledcWriteNote(0,NOTE_C,octave);

    delay(2000);

    ledcWriteTone(0,0);

    Serial.print("Opening Pump");

    digitalWrite(RELAY_PIN, HIGH); // turn on pump 4 seconds

    delay(4000);

    digitalWrite(RELAY_PIN, LOW); // turn off pump 4 seconds

    delay(4000);

}

Serial.print("The water sensor value: ");
```

```
Serial.println(value);

if ( value <= 300){

    ledcWriteTone(0,800);

    delay(1000);

    uint8_t octave = 1;

    ledcWriteNote(0,NOTE_C,octave);

    delay(1000);

    ledcWriteTone(0,0);

}

}

void loop() {

    ultra();

    digitalWrite(RELAY_PIN, LOW);

}
```

Conclusion

Challenges: list any challenges you had getting things working

It was hard mostly because our group was large. there was many people so when it's needed, we couldnt meet up properly with everyone. so It was a challenge for us.

Second challenge was the hardware part. we aren't experienced about electronics so we were in a tough situation. we tried to learn everything from the start. and this process took so much time. We waste our times because of this. We did mistakes and start again again and again.

And last challenge was the coding part. we wrote the codes but some of them weren't working. so it was a downfall for the project. But we made the project somehow.





References:

- IEEE Referencing standard, i.e.:
- Hasani, R., Lechner, M., Amini, A., Rus, D., & Grosu, R. (2020). Liquid time-constant networks. arXiv preprint arXiv:2006.04439.