

# **“SMART HAND SANITIZER”**

A mini project report submitted  
in partial fulfilment of requirement for the completion of  
**Smart System Design course**

By

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## INTRODUCTION:

In this COVID-19 pandemic period which is a global outbreak, hand hygiene is the core preventive measure in the spread of the disease as advised by WHO (World Health Organization) which includes washing hands with water and soap regularly, hand sanitizing using hand sanitizers, etc. but it should be realised that a regular monitoring of body temperature and periodical hand sanitization can prevent the spread of the pandemic to the masses.

Hygiene refers to the practices conducive to maintaining health and preventing disease especially through cleanliness such as washing hands, coughing in the elbow etc. Hand washing helps to prevent any diseases that spread through contact. In order to eliminate most of the germs on the hands, we need to apply a good hand washing practice. In most healthcare settings, alcohol-based hand sanitizers are preferable to hand washing with soap and water because it can be easily tolerated and it is also more effective at reducing bacteria. Hand sanitizer is a liquid, gel, or foam generally used to decrease infectious agents on the hands. A sanitizer is designed to kill germs on skin, objects and surfaces.

This project aim is to design and implement a low cost, smart hand sanitizer dispenser with temperature sensor.

Keeping in mind, the situation worldwide, sanitization commodities should be installed in each and every corner of the sphere, be it an industry, a corporate office, an educational institute or an shopping mall.

In this research work, an automatic hand sanitizer with temperature sensing design prototype has been made.

## **PROBLEM:**

The COVID-19 pandemic has radically affected life for almost everyone around the globe, and makers are no exception. With everyone being more careful of their interactions with humans and objects, personal hygiene has taken serious precedence over all other factors in public space. A lot of public places have hand sanitizers for visitors, but they need to be manually pressed.

To avoid any contact at all, some no-touch hand sanitizer dispensers are commercially available, but they are expensive and most off-the-shelf commercial sanitizers cannot be automated. In this project, we create a contactless hand sanitizer dispenser that can be used for any press-to-release hand sanitizer available in the market.

In this covid pandemic, hand hygiene is must. But we are using foot operated sanitizers and hand operated sanitizers. Through contact of hands or legs there is a chance of spreading virus. so, we have to avoid the contact process.

someone has to check the temperature of our body. There is a chance of spreading virus. we have to avoid the contact of another person.

## **SOLUTION:**

In order to eradicate the problem, we here came up with project smart hand sanitizer .

Designing smart hand sanitizer with thermal temperature sensor and Ultrasonic sensor (an ultrasonic sensor is used to check the presence of hands below the outlet of the sanitizer, thermal temperature sensor used to check automatically the body temperature of a person). This solves the problem of avoiding contact with persons and objects.

The temperature is displayed on lcd.

If the temperature is low the sanitizer will dispense. If the temperature is high the sanitizer will not dispense and we are attaching an alarm which rings when the temperature is high and alerts the security guard not to allow that person into hall.

We are using 2 led lights (red light for not dispensed sanitizer, and green light for dispensed sanitizer).

## PROJECT DESCRIPTION:

The design introduces an automatic hand sanitizer and temperature sensing system, to keep the hand sanitized whenever a person wants to do it, without a contact with the sanitizing machine. The temperature sensor gives the body temperature of the person.

The design encompasses few parameters to be calculated and taken as priority, such as -

- ☐ Installation of temperature sensor.
- ☐ Installation of LCD to display the sensed temperature.
- ☐ Installation of ultrasonic sensor.
- ☐ Installation of spray pumps/submersible pumps.

Components used:

Ultrasonic sensor

Temperature sensor

servo motor

Arduino

Breadboard

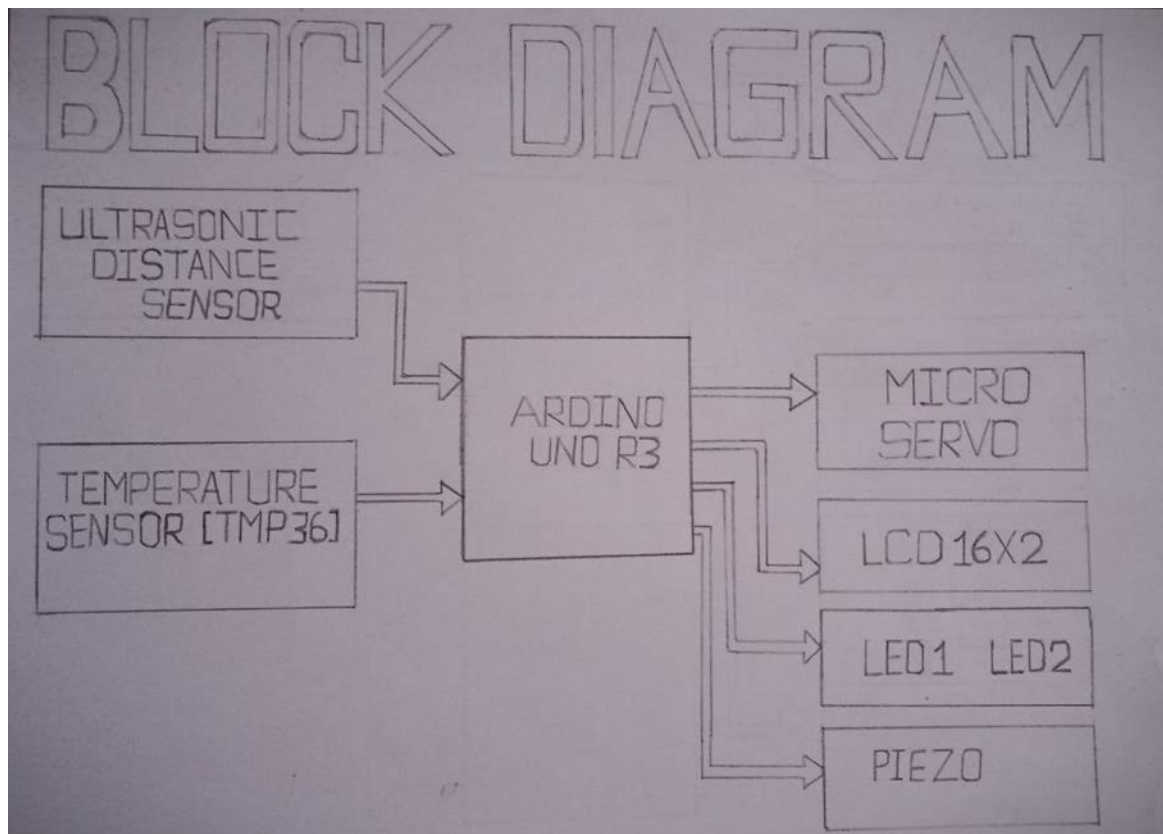
Led lights

Lcd display

Resistors

Piezo buzzer

## BLOCK DIAGRAM



## RESULTS:

As we switch on the device, the sensors attached to the Arduino gets activated. We have two systems to work simultaneously to each other. First the automatic sanitizer and secondly the contacted temperature sensing.

The ultrasonic sensor is attached to the Arduino for detection of human/object ranging and motion respectively.

The temperature sensor senses the body temperature of the person as soon as it is touched, and displays the temperature in F in the lcd display (as it is programmed to convert C to F). If the temperature sensed is above the normal body temperature ( 98 F) the buzzer starts alarming and the red led is on, if the sensed value of the sensor is equal or below 98 F then the buzzer is off and the green is on. Depicting a symbol of safe and safety.

After connecting all the components in tinkercad with code, when we stimulate if ultrasonic sensor does not detects any hand it prints an message "hand not detected "on the lcd display and motor is off in stage and red led is on and sanitizer will not be dispensed

If ultrasonic sensor detects hand, then temperature sensor senses the temperature and display the temperature on lcd screen.

1.If temperature is low (<98F) -motor is on

-green led is on

At this condition the sanitizer will be dispensed.

2.If temperature is high(>98F)-motor is off

-red led is on

-buzzer rings

At this condition the sanitizer will not be dispensed.

### **FUTURE SCOPE:**

At this time, we target Offices, Factories, Companies employees but in the upcoming version we add the functionality for a Visitor of any Shops, hotels, Banks, hospitals etc. so this machine will work at that places also.

It can be manufactured in any household at a very low cost and can be installed anywhere be it in offices, educational institutes, public transport, regular shops etc

### **CONCLUSION:**

The system surely, help in implementing the hand hygiene without any challenges as it is a must to sanitizer if you are to access any entry point. It is much safer and more recommended due to its touch less property which zeros down any chances for cross contamination. This is a user-friendly system that anyone can make use of. It can be concluded here that the system has been successfully implemented and the aim is achieved without any deviations.

With Help of This smart sanitizer no need to touch anything. So, it is true to say “TOUCH LESS DO MORE”.

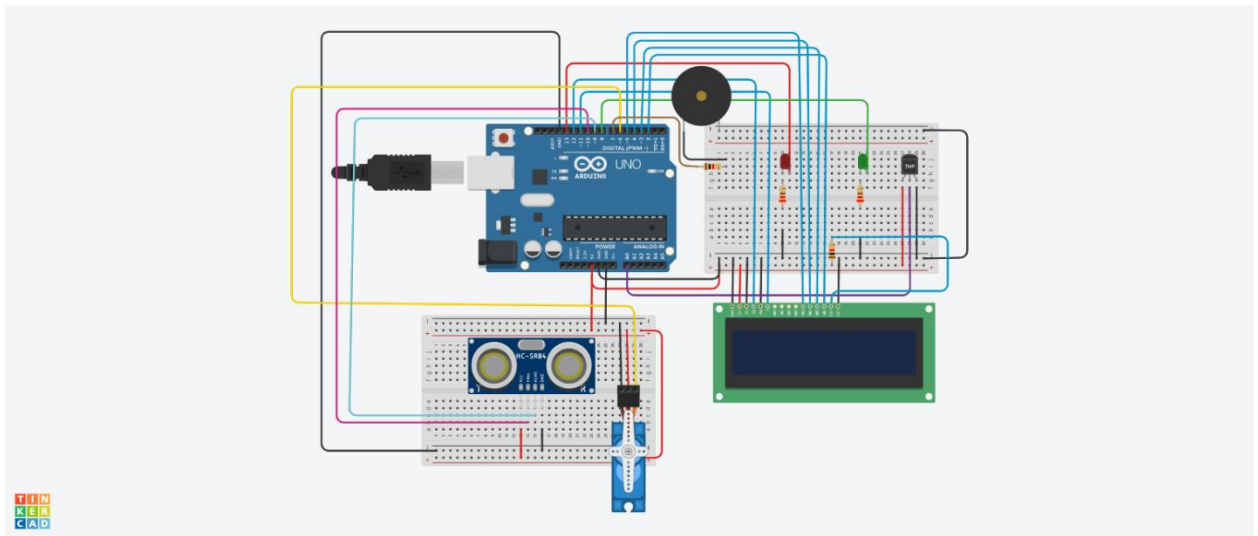
### **REFERENCES:**

arduino editor

Automatic hand sanitizer model in tinkercad

## PHOTOS OF WORKING PROTOTYPES:

### Circuit connections:





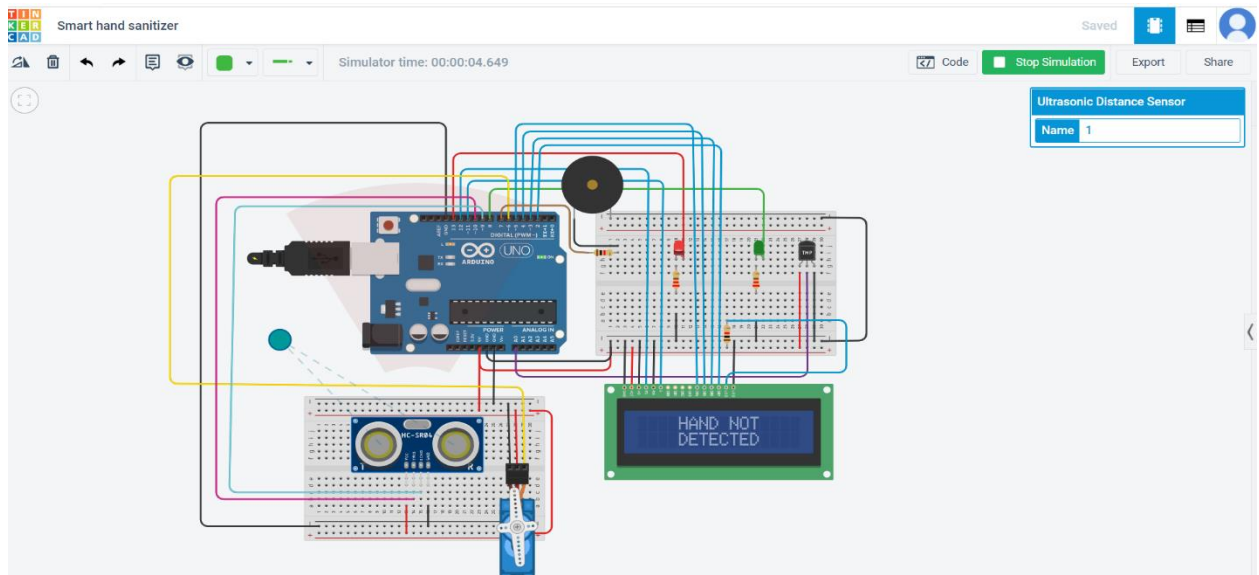
### Case-1:

when ultrasonic sensor doesn't detect hand

-motor is off

-red led is on

- "hand not detected" is displayed on the lcd



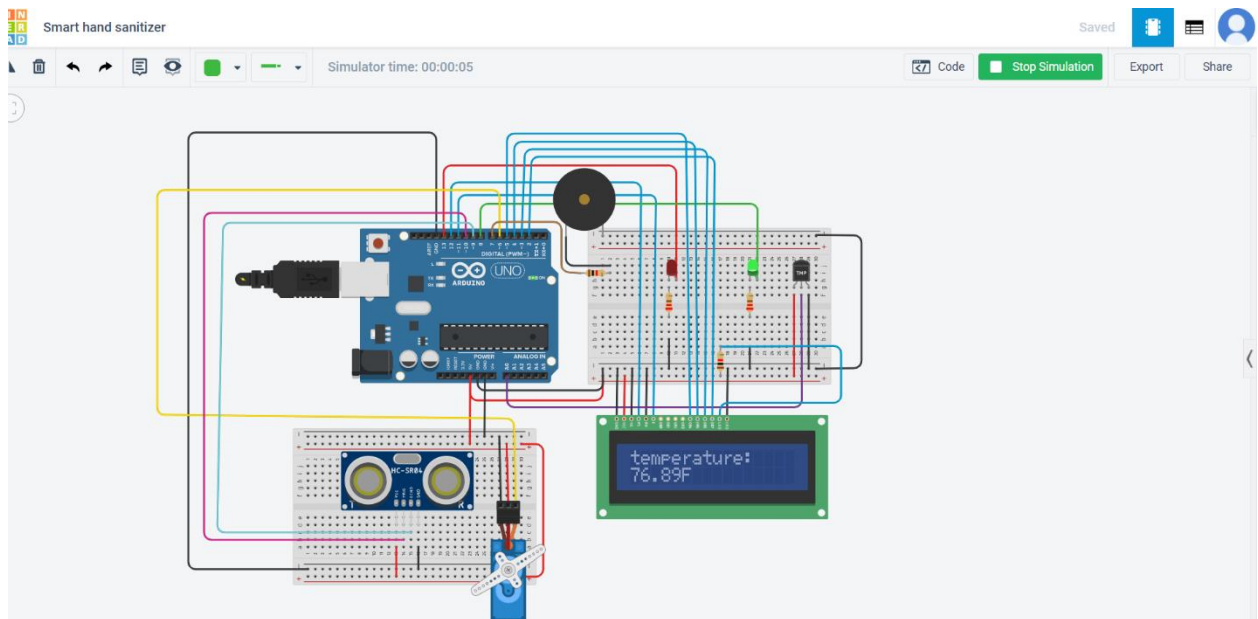
case 2:

when ultrasonic sensor detects hand and temperature is low ( $<98\text{ F}$ )

-motor is on (dispense sanitizer)

-green led is on

-temperature is displayed on the lcd



### Case 3:

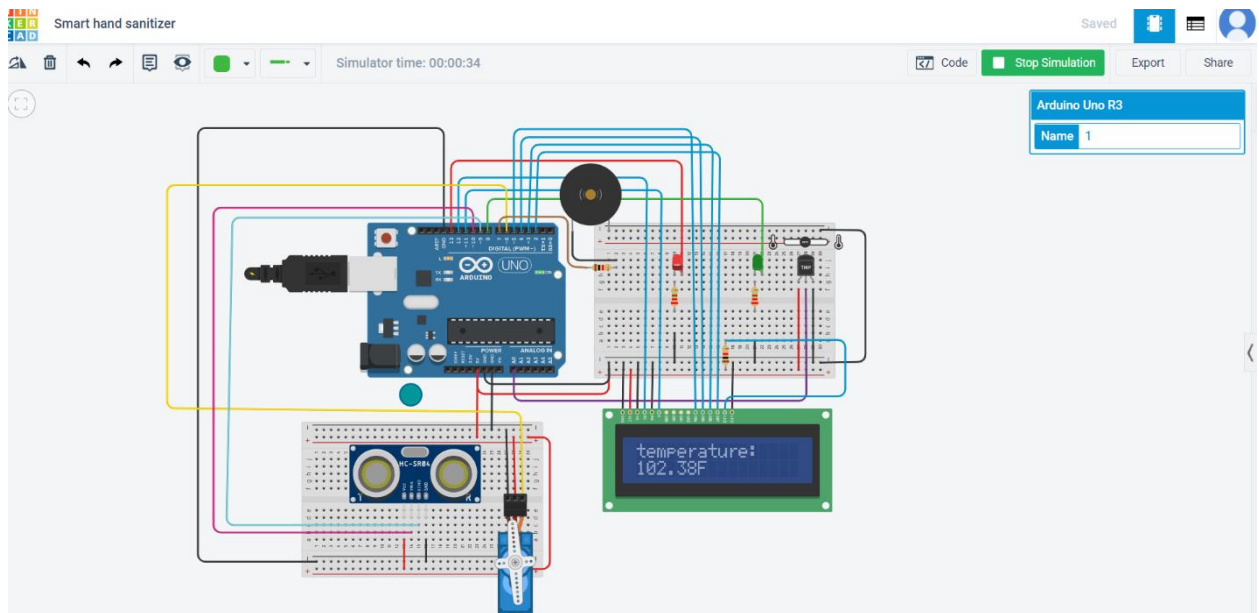
when ultrasonic sensor detects hand and temperature is high (>98 F)

-motor is off (will not dispense sanitizer)

-red led is on

-temperature is displayed on the lcd

-buzzer rings



### WORKING CODE:

```
#include<LiquidCrystal.h>

#include <Servo.h>

Servo myservo;

int pos=0,readValue;

const int echoPIN=9,trigPIN=10;

float tempC,tempF;

double distance,duration;

LiquidCrystal lcd(12,11,5,4,3,2);

void setup()

{

    pinMode(13,OUTPUT);

    pinMode(8,OUTPUT);

    pinMode(echoPIN,INPUT);

    pinMode(trigPIN,OUTPUT);

    Serial.begin(9600);

    lcd.begin(16,2);

    myservo.attach(6);

}

void loop()

{

    digitalWrite(trigPIN, LOW);

    delayMicroseconds(2);

    digitalWrite(trigPIN, HIGH);

    delayMicroseconds(10);
```

```

digitalWrite(trigPIN, LOW);

duration=pulseIn(echoPIN,HIGH);

distance=duration * 0.0344/2;

Serial.print(distance);

Serial.println("cm");

if(distance<=15)

{

    readValue=analogRead(A0);

    tempC = ((readValue-20) * 0.48828125)-40;

    tempF = (tempC*1.8)+32;

    lcd.setCursor(0,0);

    lcd.print("temperature: ");

    lcd.setCursor(0,1);

    lcd.print(tempF);

    lcd.print("F      ");

    if(tempF>98)

    {

        digitalWrite(13,HIGH);

        digitalWrite(8,LOW);

        tone(7,200.100);

        delay(1000);

    }

    else

    {

        digitalWrite(8,HIGH);

        digitalWrite(13,LOW);

```

```
noTone(7);

for (pos = 0; pos <=140; pos ++)
{
    myservo.write(pos);

    delay(5);
}

for (pos = 140; pos >=0; pos --)
{
    myservo.write(pos);

    delay(5);
}

}

else
{
    lcd.setCursor(0,0);

    lcd.print("  HAND NOT  ");

    lcd.setCursor(0,1);

    lcd.print("  DETECTED  ");

    digitalWrite(13,HIGH);

    digitalWrite(8,LOW);

    noTone(7);
}
}
```

TECHINCAL DATASHEETS OF DIFFERENT COMPONENTS:

Name	Quantity	Component
U1	1	Arduino Uno R3
U2	1	LCD 16 x 2
U3	1	Temperature Sensor [TMP36]
R1 R4	2	1 kΩ Resistor
R2 R3	2	220 Ω Resistor
D1	1	Red LED
D2	1	Green LED
PIEZ01	1	Piezo
SERVO1	1	Positional Micro Servo
DIST1	1	Ultrasonic Distance Sensor