

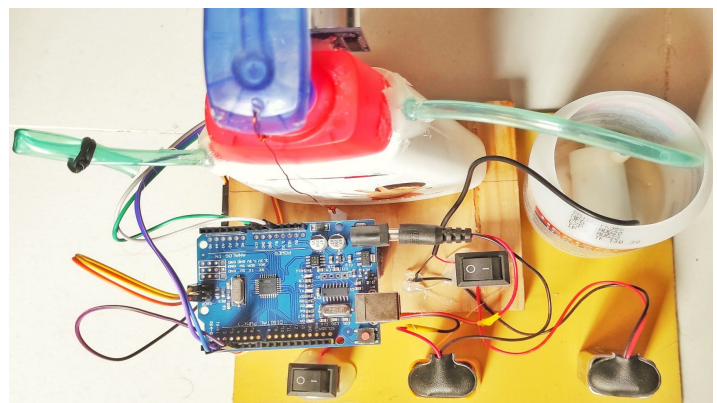
Touchless sanitizer machine

INTRODUCTION:

Viruses such as COVID-19 are transferable through touch and contact. There are WHO guidelines to clean or sanitize hands regularly to reduce the risk of infection. Dispensing the sanitizer from the bottle and storage would require manual intervention. In this paper we propose a novel design of touchless sanitizer machines to reduce the risk due to contact. The system can sense the proximity with the help of an ultrasonic sensor and sends a signal to the microcontroller. The controller processes the sensor data & actuates the pump and solenoid valve. The sanitizer liquid dispenses through a mist nozzle.

PROPOSED SYSTEM:

We have designed a sanitizer dispensing machine in a plastic cabinet as shown in figure. The system consists of a proximity sensor based on ultrasonic principle. The sensor used in the system is SR04 to sense whether the hands are under the machine or not. The cabinet design was originally fabricated for the water RO system and has been modified for the purpose of sanitizer dispensing action. The sanitizer storage section is on the front side upper region. Filters have been removed and the water dispensing tap has also been removed. Mist nozzle has been added at the bottom side of the cabinet. The pump is used to suck the sanitizer and pump it with a pressure to the nozzle and refill the sanitizer bottle. Pipes and attachments helped to make it easy to fabricate. Servo motor helps to drop the liquid once.



Instrument:

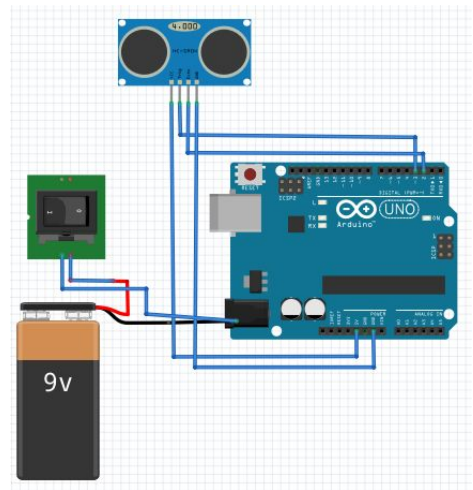
Arduino Anu:

Electronics prototyping platform based on flexible, easy-to-use hardware and software. Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. We used this circuit to maintain the sanitizer.

Ultrasonic sonar sensor HC-SR04:

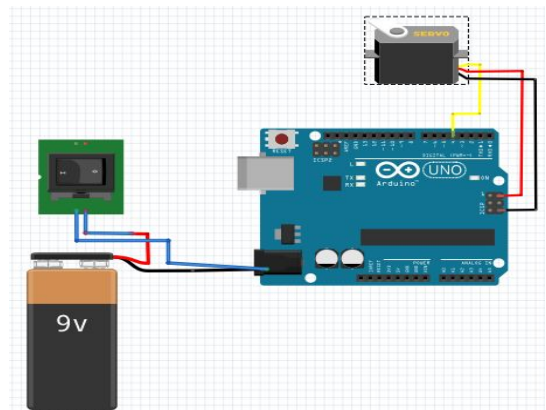
This ultrasonic sonar sensor allows to measure distances from 2cm to 400cm with an accuracy up to 3mm. The HC-SR04 sonar sensor comprises a ultrasonic transmitter, an ultrasonic receiver and a control circuit. The 4 pin connection correspond to:

- Power 5V to Vcc
- Trigger pulse (input) to pin 3
- Echo pulse (output) to pin 2
- 0V (ground) to Gnd



Servo Motor:

The servo motor is most commonly used for high technology devices in industrial applications like automation technology. It is a self contained electrical device, that rotates parts of the machine with high efficiency and great precision. Moreover the output shaft of this motor can be moved to a particular angle. Servo motors are mainly used in home electronics, toys, cars, airplanes and many more devices.



Pump Motor:

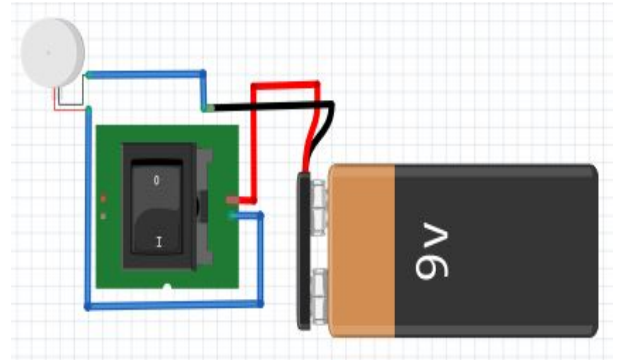
A pump is used to move fluids by using forces like air. Air moves forward from the way because the moving element starts to move. Generally, these are activated with electric motors that drive a compressor. Thus, a partial vacuum can be created because of the water movement, later it is filled with additional air.

We used the motor to refill the liquid in the main sanitizer tank.

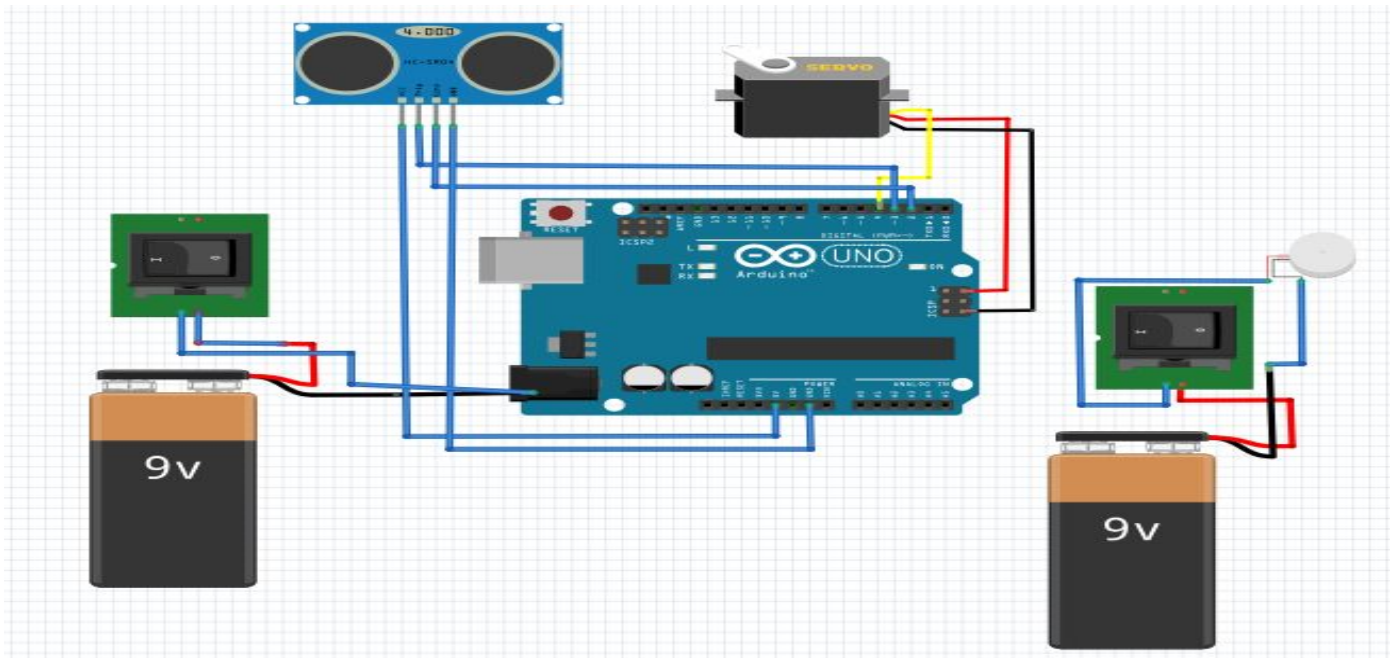
9-volt battery:

We used this battery in two ways to power up the system. One battery we used to power up the Arduino circuit and the other we used to power up the pump machine.

There 9 volt battery connected to switch and switch connected to pump machine.



Connection Diagram:



Code:

```
#include <Servo.h>
#define trigPin 3
#define echoPin 2
Servo servo;

int sound = 250;

void setup() {

  Serial.begin (9600);

  pinMode(trigPin, OUTPUT);

  pinMode(echoPin, INPUT);

  servo.attach(4);

  servo.write(0);

}

void loop() {

  long duration, distance;

  digitalWrite(trigPin, LOW);

  delayMicroseconds(2);

  digitalWrite(trigPin, HIGH);

  delayMicroseconds(10);

  digitalWrite(trigPin, LOW);

  duration = pulseIn(echoPin, HIGH);

  distance = (duration/2) / 29.1;

  if (distance < 10) {

    Serial.println("the distance is less than 5");

    servo.write(90);

    delay(2000);

    servo.write(0);

  }

  if (distance > 60 || distance <= 0){

  }

  else {

    Serial.print(distance);

    Serial.println(" cm");

  }

  delay(500);

}
```

RESULT & CONCLUSION:

An automatic sanitizer dispensing machine designed and developed. The machine is wall mounted at entrance gates of society, schools, colleges or any commercial building. It can spray 80 times with 200 ml liquid and is effective in optimizing use of liquid sanitizer. The machine is tested for 24hour operation for more than a week and is working fine. It helped to reduce the contact for getting sanitizer and also reduce manpower employed to spray sanitizer with a spray bottle.