

SIMPLE TOUCH FREE
AUTOMATIC HAND
SANITIZER

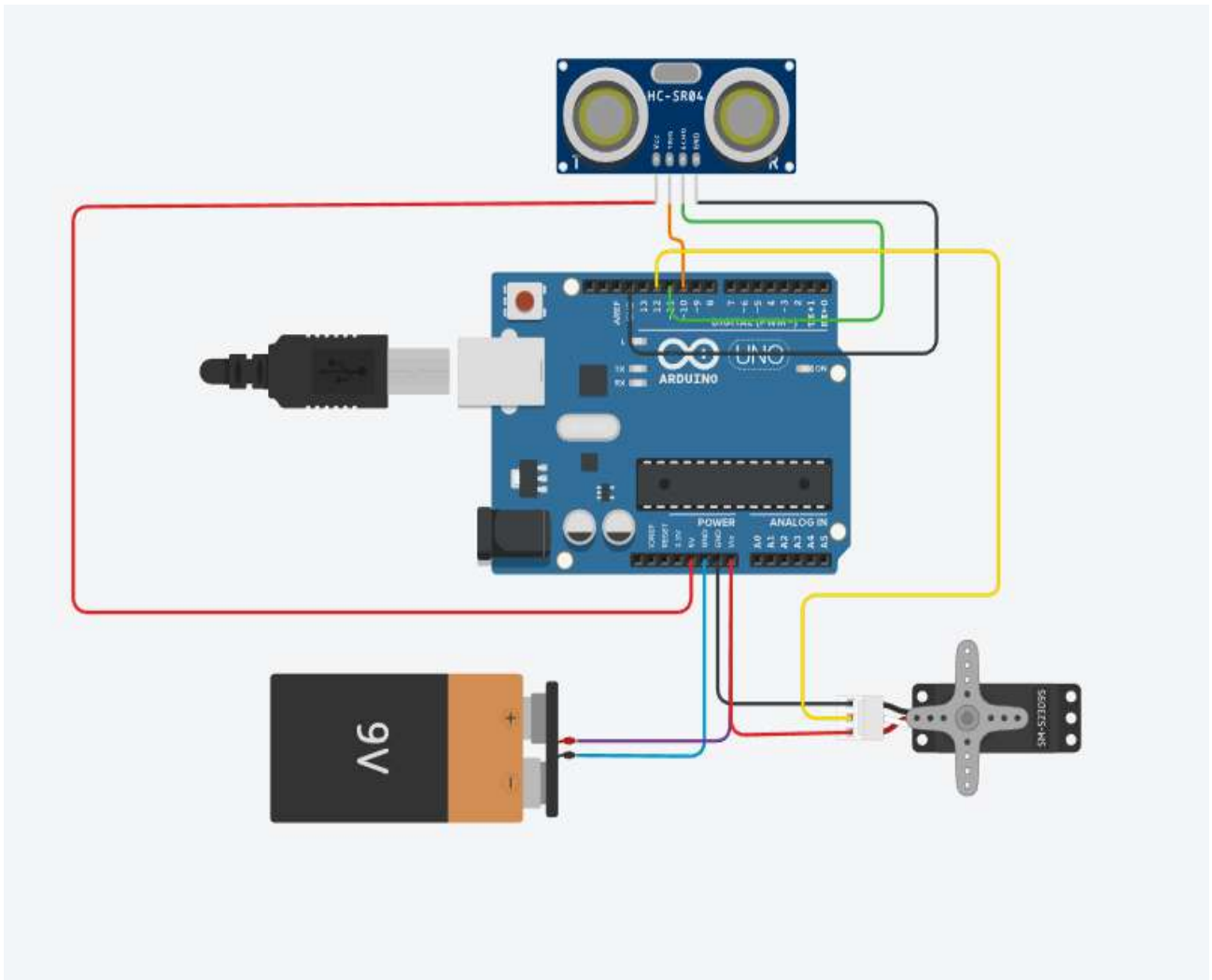
GROUP ID: 18

SECTION: 08

TEAM MEMBERS:

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CIRCUIT DIAGRAM:



ABSTRACT OF THE WORK DONE:

For making a touch less hand sanitizer with mechanical aspect we came across an idea that we can make use of a servo motor to pull the cap of sanitizer dispenser. For this to happen we needed a ultrasonic sensor which detects the movement of hand and it will send signal to the servo motor through Arduino. The cause of using servo motor is that it produces more torque and low speed, which easily causes the release of the gel sanitizer, and it is signal sensitive that is we can control it with the signal as we want. For connecting the servo motor with the cap of sanitizer we have used a high strength copper wire that can bear the stress offered by motor and pulls the cap of sanitizer.

BACKGROUND AND MOTIVATION:

Repeated waves of COVID-19 compelled us to take measures that would protect us from germs, and usage of hand sanitizer proved to be of utmost importance to get rid of germs.

Hand sanitisers has been created for use after washing hands to get rid of infections or for those occasions when soap and water are not available. They are gels that have alcohol so as to destroy the germs present on the skin.



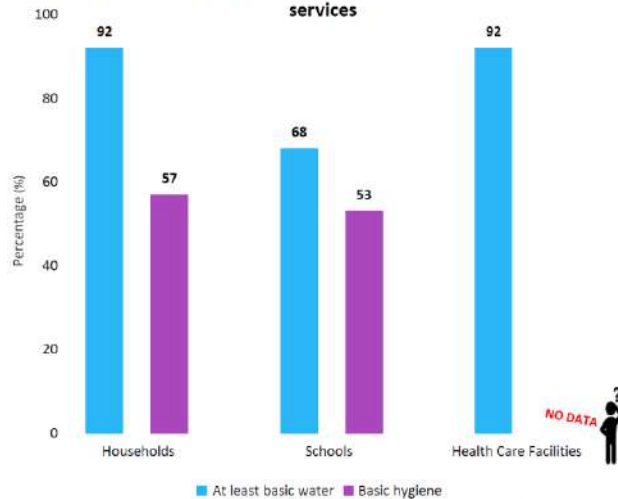
The infographic features a blue and purple background. On the right, there is a stylized illustration of a hand sanitizer bottle with a pump dispenser. A hand is shown inside the bottle, and a single drop of sanitizer is falling from the pump. In the top right corner, the World Health Organization logo is visible. The main text is in white, and a smaller text block is in the bottom left.

Alcohol-based sanitizers are safe for everyone to use

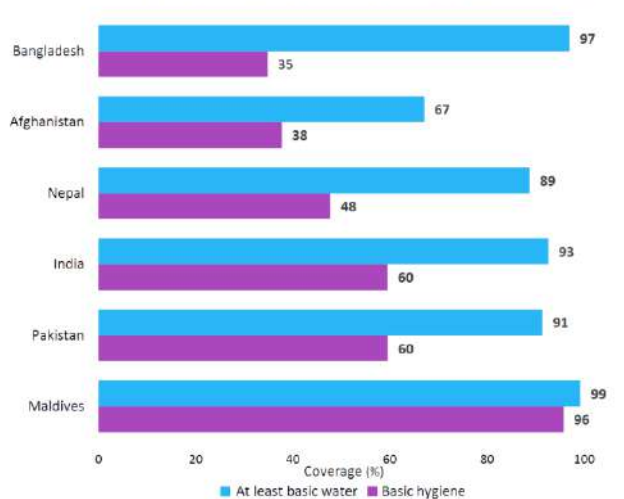
Alcohols in the sanitizers have not been shown to create any relevant health issues. Little alcohol is absorbed into the skin, and most products contain an emollient to reduce skin dryness. Allergic contact dermatitis and bleaching of hand hair due to alcohol are very rare adverse effects. Accidental swallowing and intoxication have been described in rare cases.

World Health Organization

In South Asia, washing hands with soap and water receives too low a priority at home and in schools despite the availability of basic water services



Availability of basic water services does not seem to be the limiting factor for having a hand washing facility with soap and water at home



Our group wanted to come up with an idea where we can serve our community in hard times like this. So we thought to make an automatic touch free hand sanitizer, which can further decrease the chances of spreading of germs as a touch free hand sanitizer reduces chances of human contact.

CURRENT SOLUTIONS AND THEIR PROBLEMS:

The easy to carry sanitizers available in the market are not touch free, they need to be operated by hand. The other solutions include soaps, which are difficult to carry around after one use, once the soap comes in contact with water. Often the touch free sanitizer available in the market are too costly to be used at homes and by common people and also it takes up a large space.



Objectives of the project:

The objectives of the project are:

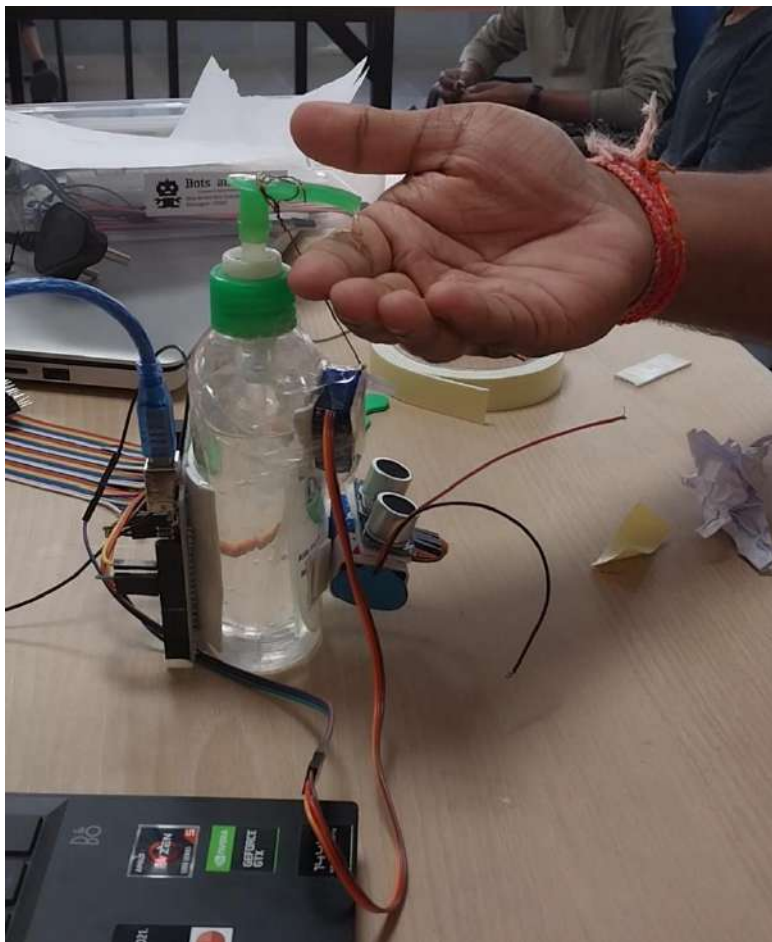
- 1. To make a hand sanitizer that is touch free.**
- 2. To make a hand sanitizer that is compact, easily transportable and can be afforded by people.**
- 3. To make a hand sanitizer using Arduino and learn about its applications.**

Work done:

For making a touch less hand sanitizer with mechanical aspect we came across an idea that we can make use of a servo motor to pull the cap of sanitizer dispenser. For this to happen we needed a ultrasonic sensor which detects the movement of hand and it will send signal to the servo motor through Arduino. The cause of using servo motor is that it produces more torque and low speed, which easily causes the releases the gel sanitizer, and it is signal sensitive that is we can control it with the signal as we want. For connecting the servo motor with the cap of sanitizer we have used a high strength copper wire that can bear the stress offered by motor and pulls the cap of sanitizer

We made the code as After detecting any movement the servo motor

operates for 1.5 seconds. And if the hand is not removed, then it dispenses again with a delay of 1sec. the range of the ultrasonic sensor is made as 7cm or 700mm.



Hand_Sanitizer | Arduino IDE 2.0.3

File Edit Sketch Tools Help

Arduino Uno

Hand_Sanitizer.ino

```
1  #include <Servo.h>
2
3  const int trigPin = 10;
4  const int echoPin = 11;
5  long duration;
6  int distance;
7
8  Servo myServo;
9  void setup() {
10
11  myServo.attach(12);
12  pinMode(trigPin, OUTPUT);
13  pinMode(echoPin, INPUT);
14  Serial.begin(9600);
15
16  }
17
18  void loop() {
19
20  distance = calculateDistance();
21
```

Hand_Sanitizer | Arduino IDE 2.0.3

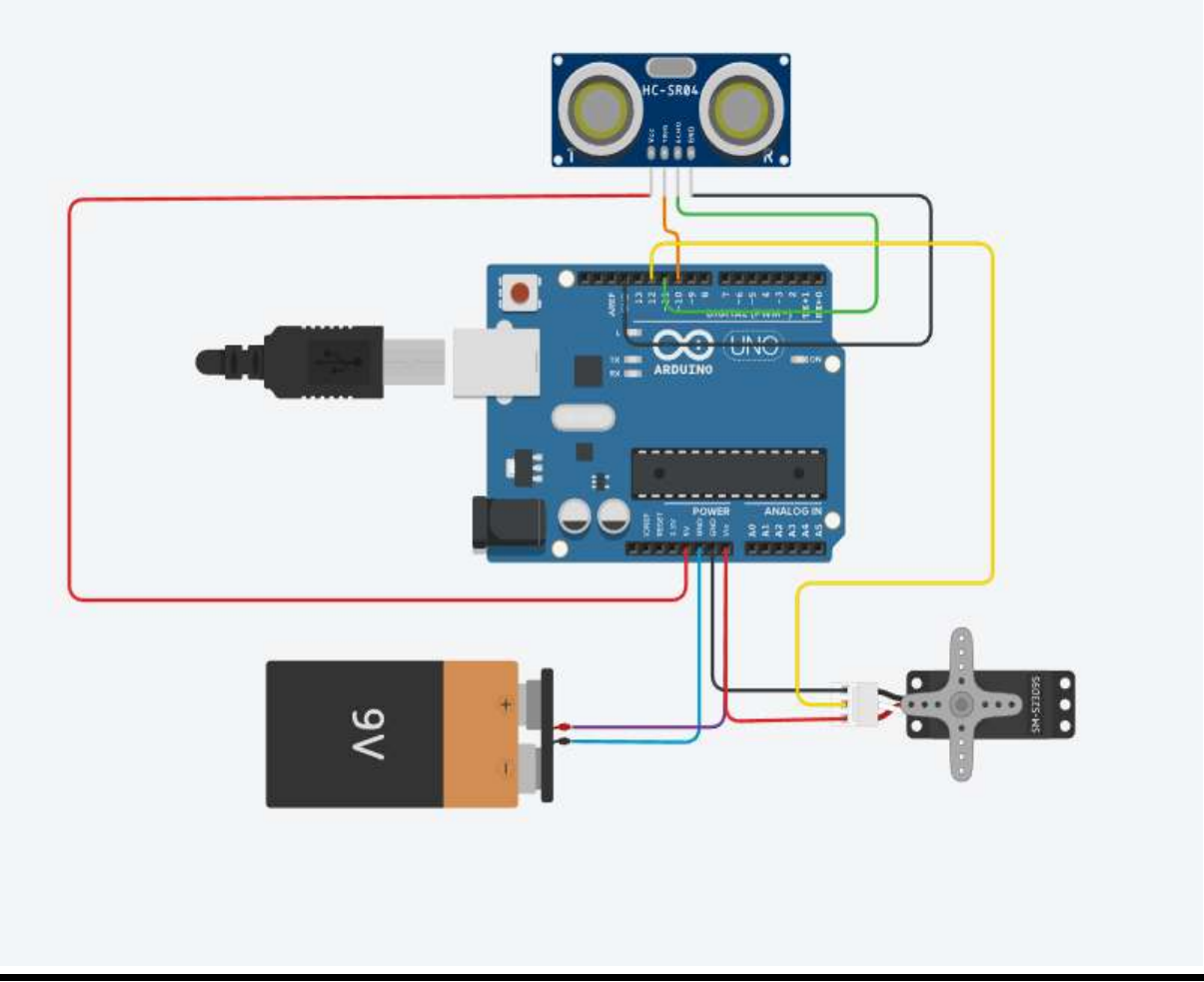
File Edit Sketch Tools Help

Arduino Uno

Hand_Sanitizer.ino

```
22
23  myServo.write(0);
24  if ( distance < 7)
25  { myServo.attach(12);
26  myServo.write(160);
27  delay(1500);
28  myServo.write(0);
29  delay(1000);
30
31  }
32  else{
33  myServo.detach();
34  }
35  Serial.println(distance);
36  }
37  int calculateDistance(){
38
39  digitalWrite(trigPin, LOW);
40  delayMicroseconds(5);
41
42  digitalWrite(trigPin, HIGH);
43  delayMicroseconds(10);
44  digitalWrite(trigPin, LOW);
45  duration = pulseIn(echoPin, HIGH);
46  distance= duration*0.034/2;
47  return distance;
48  }
49
```

Output



Learnings from work done and challenges faced:

Learnings:

- 1. Getting more accustomed to Arduino and its applications.**
- 2. Development of teamwork.**
- 3. Helping common people to protect themselves from diseases.**

Challenges:

- 1. Set up of the model was a challenge as the sanitizer at first kept on leaking, thus interrupting the functioning of the servo motor and sensor.**
- 2. The second crucial problem we solved was the torque generation by the servo motor. The arm of motor has many holes when we**

winded the wire in the middle portion it can't give the required amount of torque but using a bit of mechanics knowledge we did it with the 1st hole itself and as a result it worked. Same thing we did with the cap portion of sanitizer also.

**Concluding remarks and
acknowledgement:**

We learnt how to construct an automatic hand sanitizer using Arduino, its application, which can be used in our daily life.

We want to thank our DIY Lab professors and teaching assistants for guiding us and coming up with an incredible project idea that helped us to develop our creativity, analytical and problem solving skills.

References:

1. **<https://www.arduino.cc/en/Guide/Windows>**
2. **<https://www.fortunebusinessinsights.com/hand-sanitizer-market-102710>**