

A PROJECT REPORT
ON
“AUTOMATIC HAND SANITIZER DISPENSER”

Submitted by

17ME02

17ME08

17ME10

17ME20

In partial fulfillment for the award of the Degree

Of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

UNDER THE GUIDANCE

Of

Prof. JALAL KHAN



DEPARTMENT OF MECHANICAL ENGINEERING

ANJUMAN-I-ISLAM

KALSEKAR TECHNICAL CAMPUS NEW PANVEL,

NAVI MUMBAI – 410206

UNIVERSITY OF MUMBAI

ACADEMIC YEAR 2020-2021



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Affiliated to Mumbai University)

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CERTIFICATE

This is to certify that the project entitled “**AUTOMATIC HAND SANITIZER DISPENSER**”

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Prof. _____

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APPROVAL OF DISSERTATION

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(Internal Examiner)

(External Examiner)

Date: **29-05-2021**

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ABSTRACT

Demand for hand sanitizers has surged since the coronavirus broke out and spread around the world. Hand sanitizers are usually applied by squirting the sanitizer liquid when one presses a pump with one's hand. This causes many people to come into contact with the pump handle, which increases the risk of viral transmission. Some hand sanitizers on the market are automatically pumped.

However, because sanitizer containers and pump devices are designed to be compatible only between products produced by the same manufacturer, consumers must also repurchase the container for the liquid if they replace the hand sanitizer. Therefore, this paper suggests the design of an automatic hand sanitizer system compatible with various sanitizer containers.

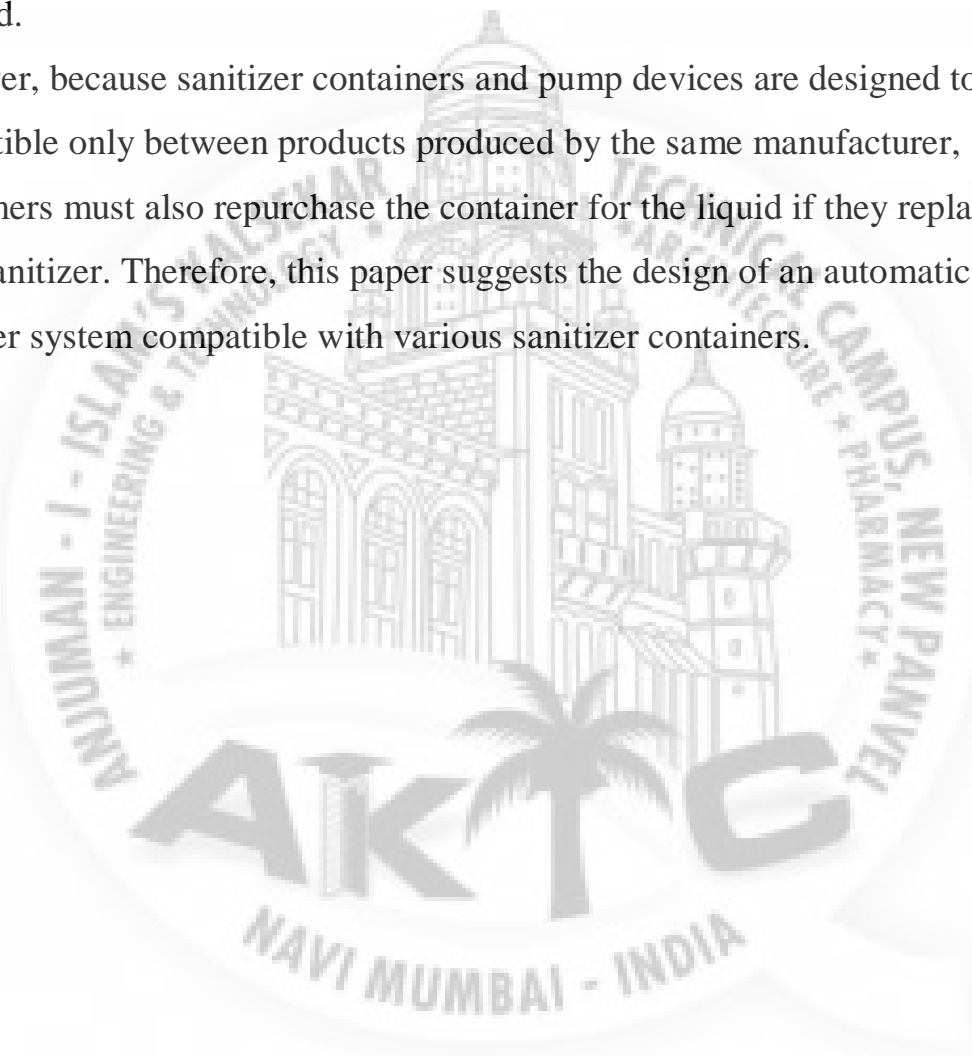
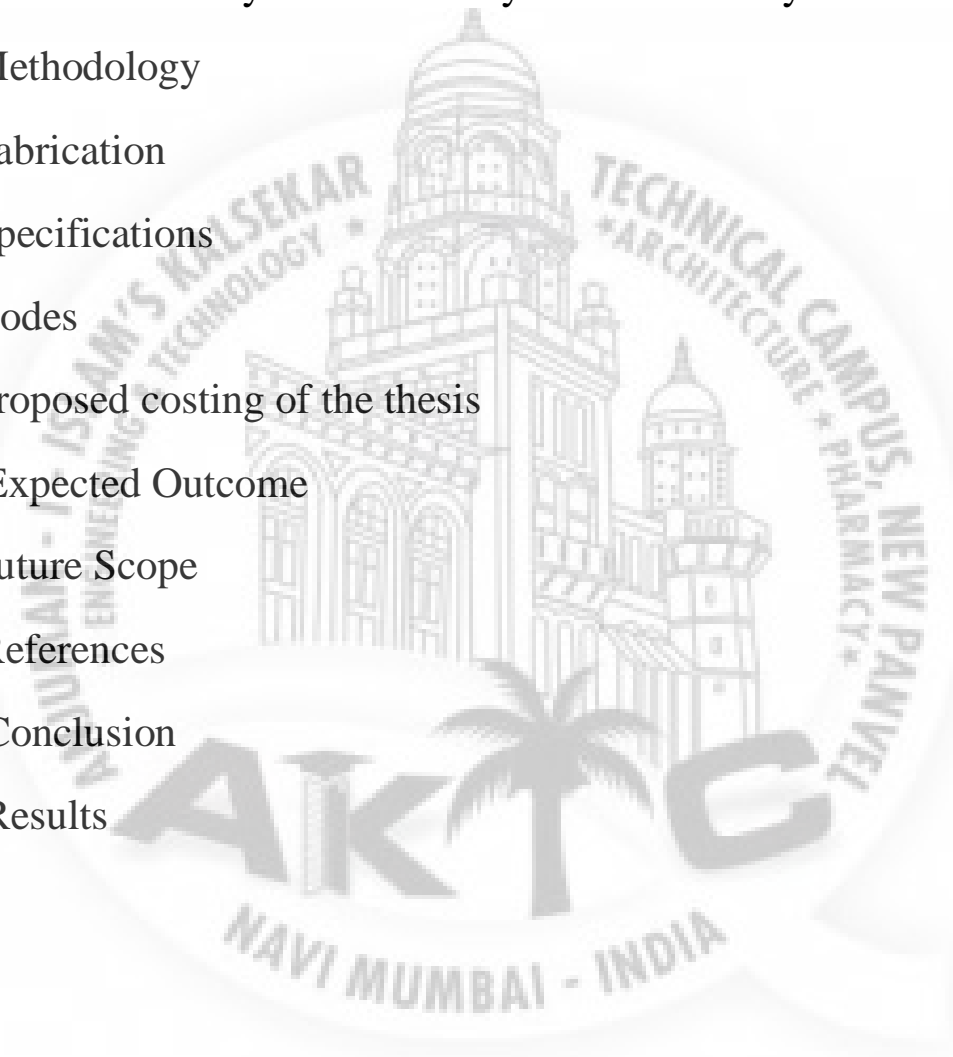


TABLE OF CONTENT

1. Introduction
 - i. Problem definition
 - ii. Aim/Objective/Purpose of the Study
 2. Literature survey/Market survey/Material survey
 3. Methodology
 4. Fabrication
 5. Specifications
 6. Codes
 7. Proposed costing of the thesis
 8. Expected Outcome
 9. Future Scope
 10. References
 11. Conclusion
 12. Results
- 

1. INTRODUCTION

Alcoholic hand sanitizer generally contains alcohol or isopropanol as the active ingredients that kill germs & bacteria. The contents of alcohol in the hand sanitizing product usually ranges between 60% to 90% which is considered by FDA to be effectively killing of germs and bacteria this include Covid-19, E. coli and MRSA.

A contactless dispensing machine sprays liquid alcohol based hand sanitizer when both hands are placed under it, its aerated mist based formula uses only 5-6ml of sanitizer ensuring optimum usage and releases full cone spray mist for 12 seconds in single operation.

Hand sanitizer, also called hand antiseptic or hand rub, agent applied to the hands for the purpose of removing disease-causing organisms. Hand hygiene is one of the most important measures to prevent the spread of infectious diseases. Hand sanitizer use is recommended when soap and water are not available for hand washing or when repeated hand washing compromises the natural skin barrier.

Although the effectiveness of hand sanitizer is variable, it is employed as a simple means of infection control in a wider areas such as daycare centres, schools, hospitals, health care clinics and super markets. As a result of rising awareness about hand hygiene and its benefits, there has been a constant increase in demand of hand sanitizers. Hand sanitizers typically come in foam, gel, or liquid form.

i) PROBLEM DEFINATION

- When we use normal hand sanitizer we have to press the top of bottle in order to take sanitizer out where most of the time germs will be present.
- To overcome this type of problem we have a modern solution on it i.e. contactless hand sanitizer dispenser machine, which will be contactless just one have to put hand on machine it will spray the sanitizer.

ii) OBJECTIVE

- The main objective of the project is to develop a contactless hand sanitizer as it is very much in demand since the coronavirus broke out and spread around the world.
- The objective of this is to design a sanitizer which is non-contact with sensors to operate it.
- This project suggests the design of an automatic hand sanitizer system compatible with various sanitizer containers.

1. This paper mainly says about the hospital grasped infections, which is about 2 Million Patients per year and also says that it is 8th leading cause for deaths annually in USA. It also says that handwashing is important and also effective with proper hand washing steps, but washing with soap and water is time consuming for peak hours in hospitals. This paper also showed the effectiveness of the alcohol based hand sanitizers, which reduced infection rates by whopping 30%. They used hand sanitizers with 60 to 70 percent ethanol or isopropanol for reducing significant number of pathogens. The patients were also given about 4.25 ounce containers of hand sanitizer alongside their beds.
2. The second paper says about the infection caused by drug resistant micro-organisms which causes increase in death rate and also complications, the multidrug resistant bacteria includes Methicillin Resistant Staphylococcus aureus(MRSA), Extended Spectrum Beta-lactamase (ESBL) producing bacteria, Multidrug Resistant Pseudomonas aeruginosa(MDRP). Several antibiotics have increasing multidrug bacteria isolation rate, even personal protection equipment(PPE) can't be effective in isolation rate of MSRA. Hence they emphasize about the use of alcohol based hand sanitizers since the alcohol based hand sanitizers had negative association with MRSA isolation rate, which means that hand hygiene is very important in hospitals.

Automatic hand sanitizer works on Arduino UNO which is the brain of the system. There are 2 sensors where in the IR sensor is used to take input on giving temperature information with the help of MLX90614, which will be displayed on LCD (16x2) panel.

Another UV sensor is placed below the LCD panel which will give inputs to DC motors when to disperse sanitizer.

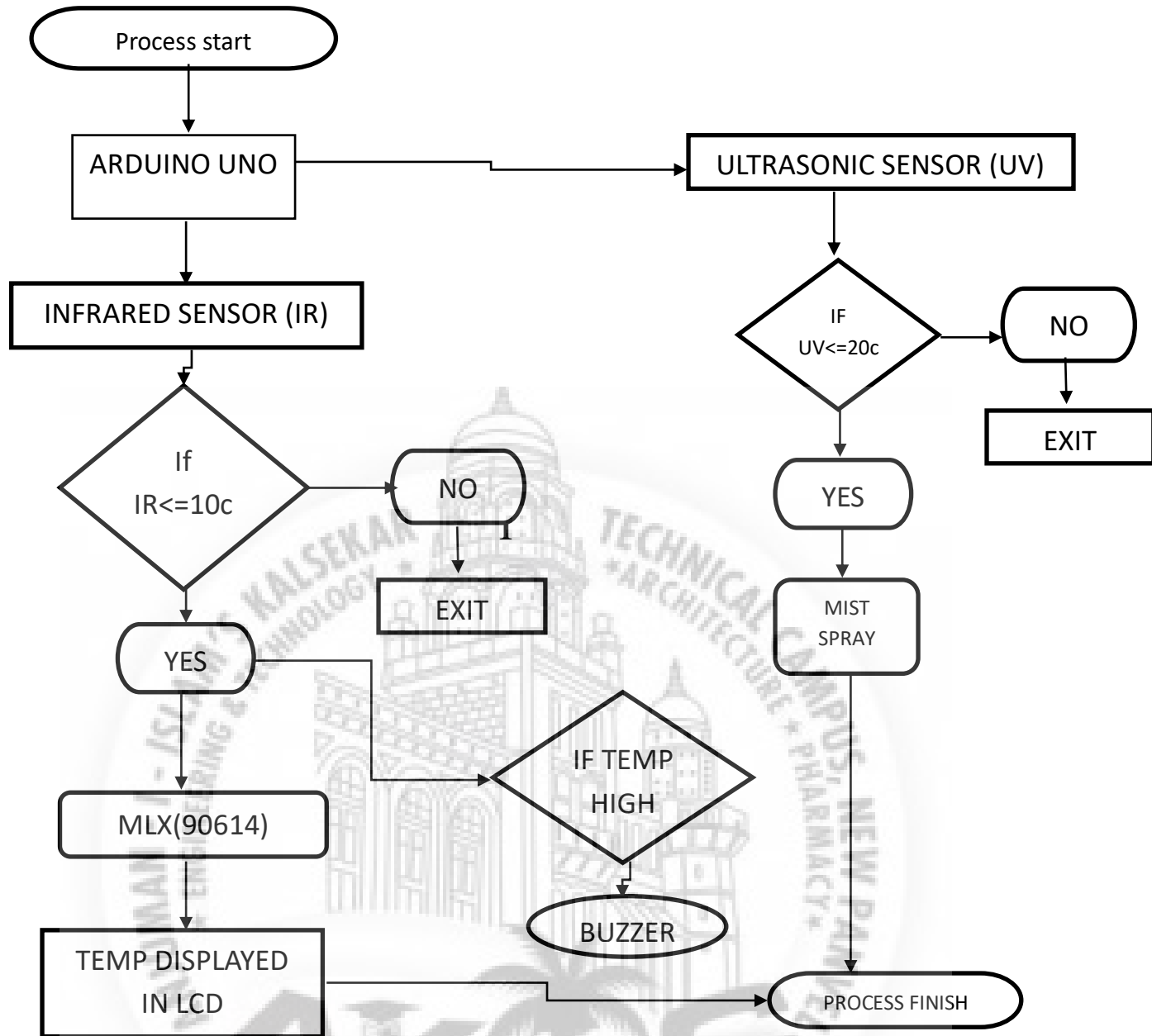
Buzzer and LED is also used if the temperature is high the machine would buzz and red LED notification and shows recorded temperature on the LCD display.

HARDWARE USED

1. ARDUINO
2. IR/UV SENSORS
3. NOZZEL
4. WATER PUMP 12V
5. RESISTOR
6. CONNECTING PIPES
7. RELAY
8. 2 POWER SUPPLY 24 V
9. TEMP SENSOR (MLX90614)
10. SANITIZER BODY
11. LCD DISPLAY

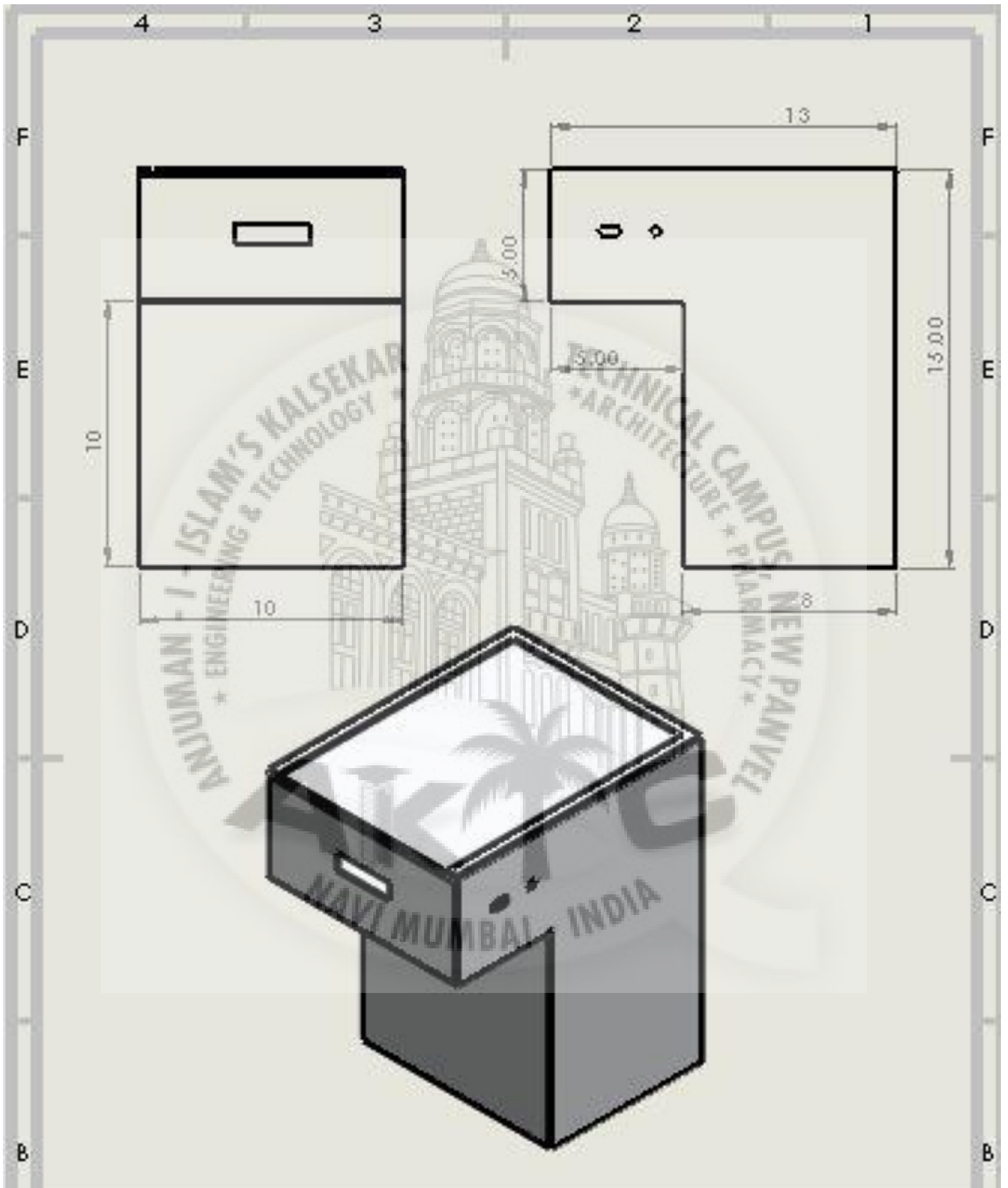
SOFYWARE USED

ARDUINO IDE



(A). FLOW CHART

4. FABRICATIONS AND ITS PROCESS



SPECIFICATIONS

MATERIAL	- MILD STEEL
GRADE	- AISI1020 STEEL COLD ROLLED
WEIGHT (without liquid)	- 7-8kgs
COATING	- OFFWHITE POWDER COATING
MECHANISM FOR OPENING	- SLIDING LID
COLOUR	- WHITE
NOTIFICATION LIGHT (MOTOR SPECIFICATION)	- RED AND BUZZER
Rated Voltage:	DC 12V
Load:	Water
water absorption:	1L-.2L/min
Current:	320mA
Flow :	2.0LPM
Total Size :	D27 x 75mm Hole Diameter : 6.5mm pressure :360mmHg
Noise:	<60dB

INSTRUCTIONS



The user measures the temperature by scanning his/her wrist



The device:

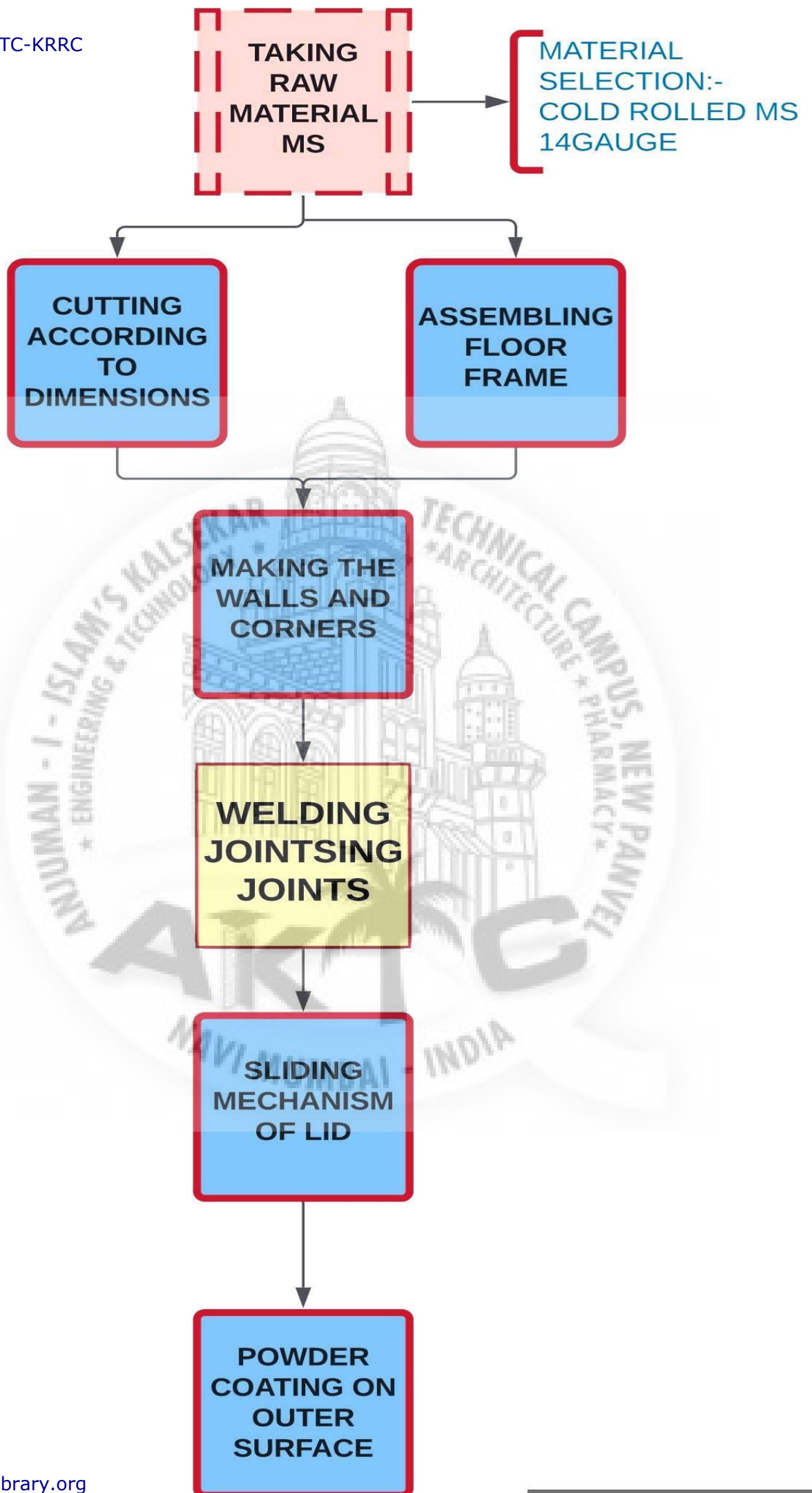
- Measures the temperature. Ascertains if it is moderate or high.
- Shows the temperature reading in LCD Display.



The user puts his/her hands below the nozzle.



The machine detects the user's hands and disperses the sanitizer



ARDUINO CODE USED

```
#include <Wire.h>

#include <Adafruit_MLX90614.h>

#include <LiquidCrystal_I2C.h>

const int trigPin = 9;

const int echoPin = 8;

const int IRsensor=13;

const int relayPin=12;

long duration;

int distance;

LiquidCrystal_I2C lcd(0x27,20,4);

Adafruit_MLX90614 mlx = Adafruit_MLX90614();

void setup() {

  pinMode(relayPin,OUTPUT);

  pinMode(trigPin, OUTPUT);

  pinMode(echoPin, INPUT);

  pinMode(IRsensor,INPUT);

  lcd.init();

  lcd.backlight();

  mlx.begin();

  Serial.begin(9600);
  ir.aiktclibrary.org
```



```
}
```

```
void loop() {
```

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

```
  delayMicroseconds(2);
```

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

```
  delayMicroseconds(10);
```

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

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

```
  distance= duration*0.034/2;
```

```
  Serial.print("Distance: ");
```

```
  Serial.println(distance);
```

```
  delay(500);
```

```
  if(distance<=5)
```

```
  {
```

```
    digitalWrite(relayPin,HIGH);
```

```
    delay(5000);
```

```
    digitalWrite(relayPin,LOW);
```

```
    delay(2000);
```

```
  }
```

```
  else if(digitalRead(13)== LOW)
```

```
  {
```

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

```
IR lcd.print(nlc.readObjectTempC());
```

```
lcd.print("*C is the");
```

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

```
lcd.println("body temperature");
```

```
delay(3000);
```

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

```
delay(2000);
```

```
}
```

```
}
```



PROPOSED COSTING THESIS

• ARDUINO UNO	400/-
• IR SENSOR	60/-
• ULTRASONIC SENSOR	75/-
• 12V WATER PUMP	250/-
• RELAY MODULE	100/-
• BUZZER	10/-
• LCD DISPLAY	200/-
• TEMPERATURE SENSOR(MLX90614)	650/-
• LED'S	10/-
• NOZZLE AND PIPE	100/-
• 12V 1A ADAPTER (FOR ARDUINO)	120/-
• 12V 2A ADAPTER (FOR WATER PUMP)	180/-

FOR THE PREVIOUS ESTIMATION AND CURRENT ,
THE COST IS 2000/- (ONLY THE COMPONENTS)

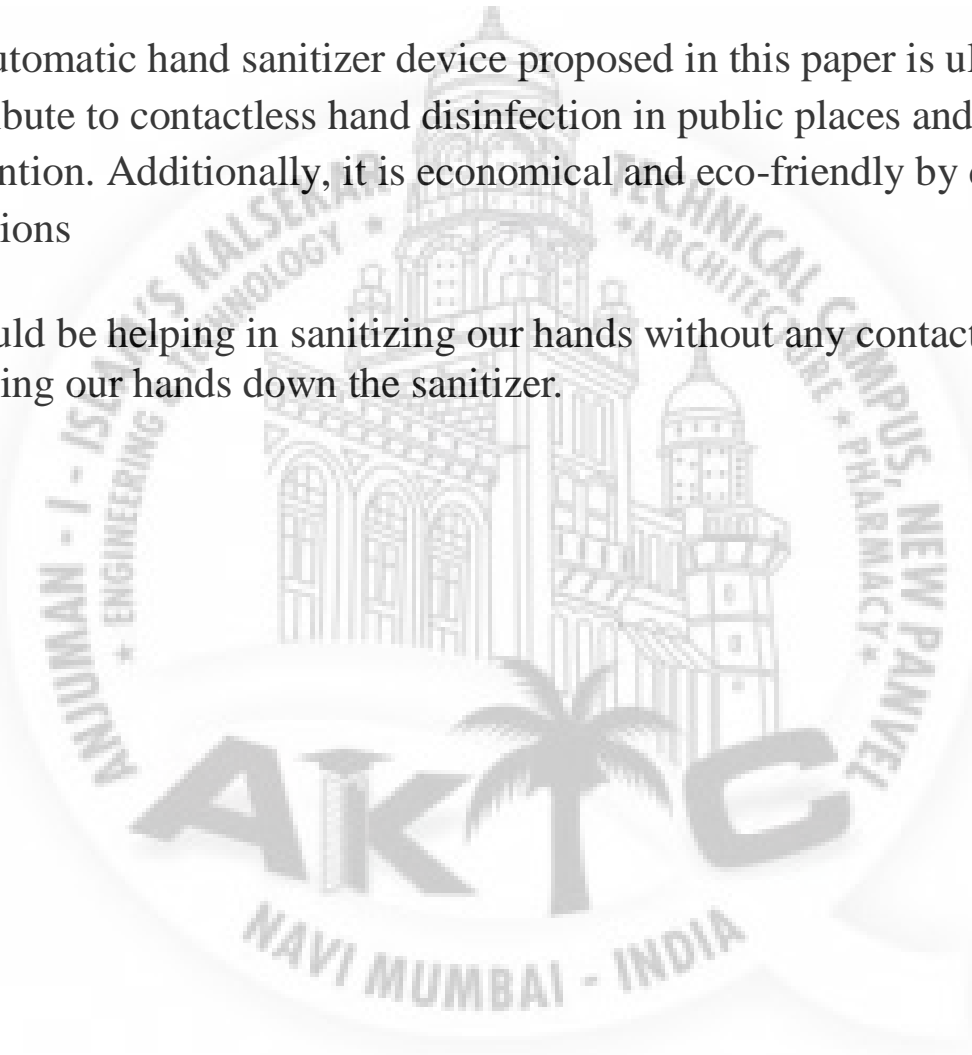
BODY

A) Raw Material (MS)	1200/-
B) Fabrication	400/-
C) Powder Coating	200/-
D) Sliding Mechanism	200/-
E) Total	2000/-

OVERALL COST IS 4000/-

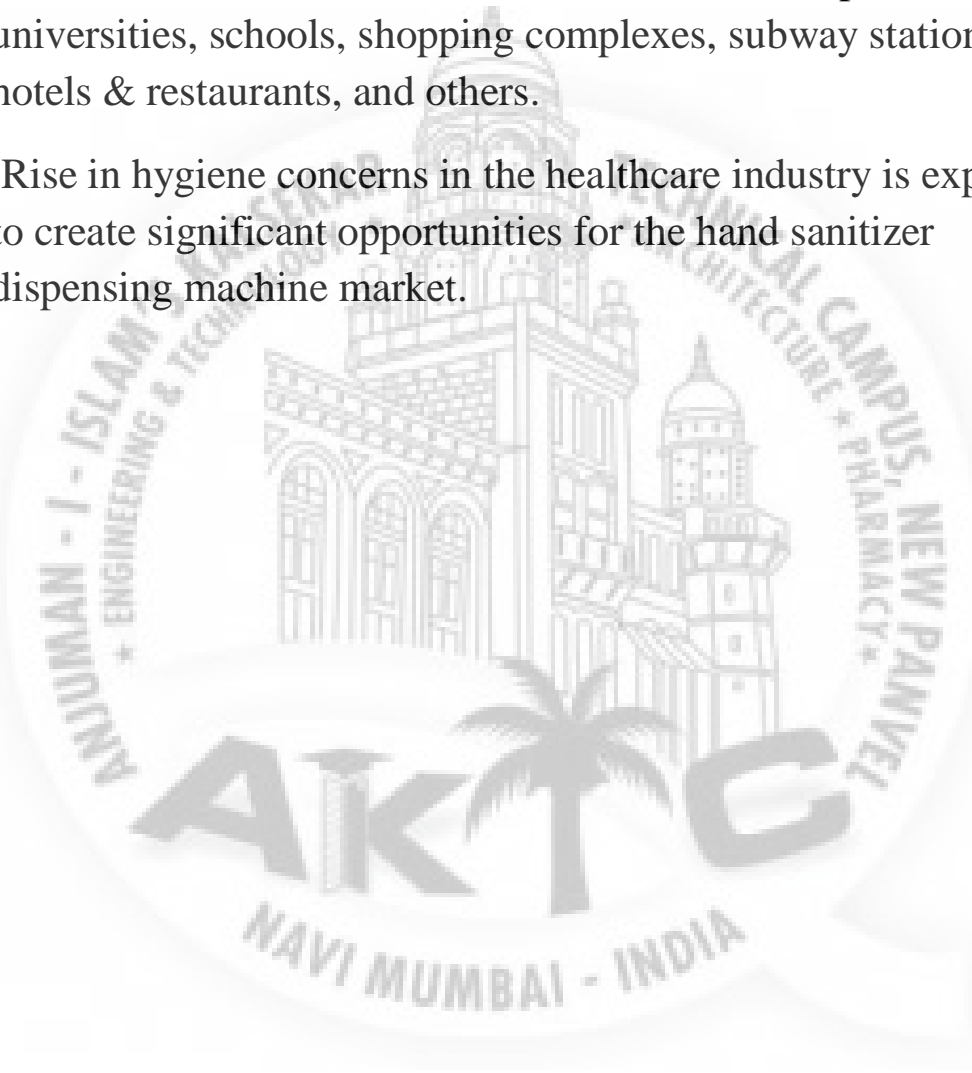
EXPECTED OUTCOME

- The automatic hand sanitizer device proposed in this paper is ultimately expected to contribute to contactless hand disinfection in public places and virus infection prevention.
- The automatic hand sanitizer device proposed in this paper is ultimately expected to contribute to contactless hand disinfection in public places and virus infection prevention. Additionally, it is economical and eco-friendly by decreasing waste emissions
- It would be helping in sanitizing our hands without any contact just by placing our hands down the sanitizer.



FUTURE SCOPE

- Hand sanitizer dispensing machine market is growing rapidly due to rise in health care. This expected to hamper the market in the near future.
- Based on end use, the hand sanitizer dispensing machine market can be divided into health care, coffee shops, colleges & universities, schools, shopping complexes, subway stations, hotels & restaurants, and others.
- Rise in hygiene concerns in the healthcare industry is expected to create significant opportunities for the hand sanitizer dispensing machine market.



<https://www.google.com/>

https://en.wikipedia.org/wiki/Main_Page

<https://www.youtube.com/>

https://shareok.org/bitstream/handle/11244/11052/Wan_okstate_0664D_12910.pdf

<https://create.arduino.cc/projecthub/akshayjosepp66/covid-19-automatic-hand-sanitizer-78cf6b>

<https://create.arduino.cc/projecthub/search?q=sanitizer+dispenser>

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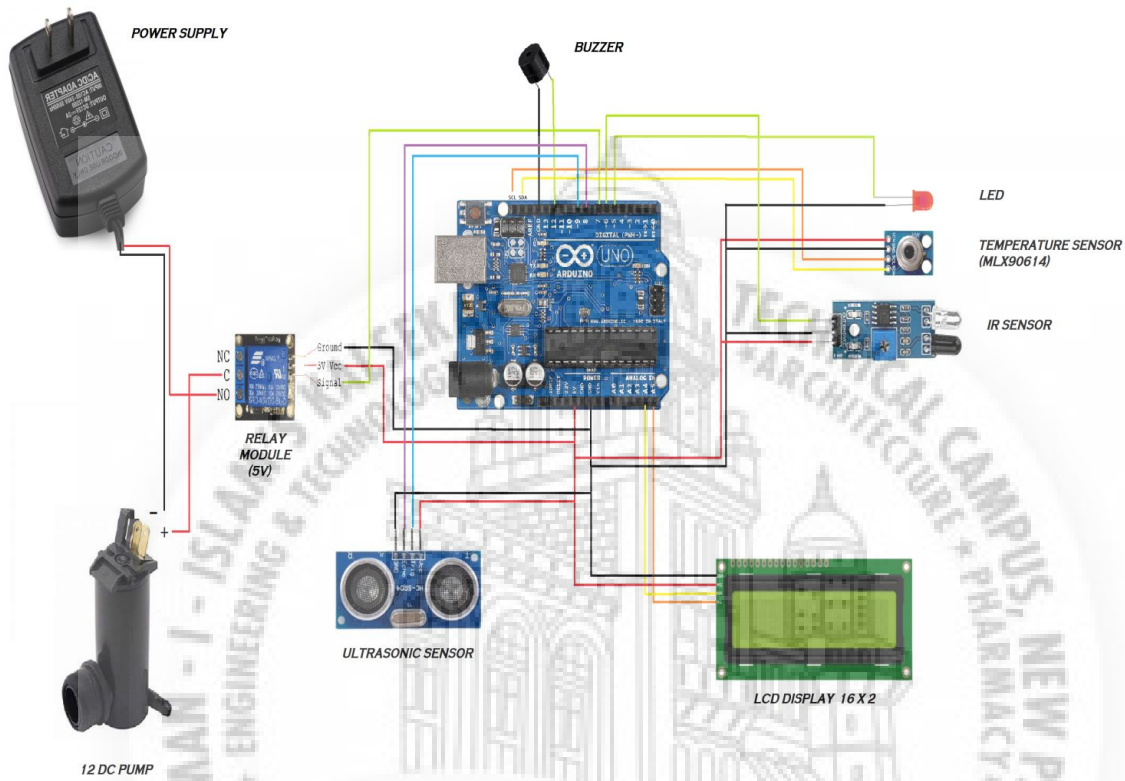
Hand sanitizers usually operate by squirting sanitizer liquid when one presses a pump with one's hand. Some hand sanitizers on the market are automatically pumped. However, sanitizer containers and pump devices are designed to be compatible only between products produced by the same manufacturer.

To address this problem, we have designed an automatic hand sanitizer system that is compatible. With the proposed device, it is possible to avoid many people coming into contact with the pump handle, thus preventing fomite viral transmission and making the use of hand sanitizer much more convenient. Moreover, the system sprays a certain amount of hand sanitizer at all times,

making it easy to manage refills and replacement. Furthermore, it can operate compatibly with various designs of sanitizer containers, so consumers do not need repurchase a container for the liquid if they replace the hand sanitizer. Thus, it is economical and eco-friendly by decreasing waste emissions. The automatic hand sanitizer device proposed by this paper is ultimately expected to contribute to contactless hand disinfection in public places and virus infection prevention.

RESULTS

We have designed an automatic hand sanitizer system that is compatible with various containers. When one moves one's hand close to the device sensor, the hand sanitizer container is pumped once. Figure show actual images of the proposed device.



CAD MODEL

ACTUAL BODY

