



Automated Sanitizer Bath

¹Rushabh Marathe, ²Samrat Kute

^{1,2}Student, B.E. Mechanical, Dr. D Y Patil College of Engineering, Pune

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ABSTRACT

Hand sanitizers are often applied by pushing the nozzle of the dispenser with hands, which exposes numerous people to the surface of the dispenser cap and raises the risk of infection. In order to protect yourself from this virus, it is necessary to practice strict hand sanitization, as advised by the WHO and the medical community. By introducing an inventive automatic body sanitizer-cum-temperature sensing system, which can perform sanitization, Mask detection and detect temperature simultaneously whenever desired, without any contact with the machine, the presented module offers a solution for this problem and eliminates the risk of infection from manual sanitizer dispenser use. The document briefly addresses the many sensors utilized in the module, including the PIR Sensor, MLX90614 (a temperature sensor), and HCSR04 (ultrasonic distance sensor).

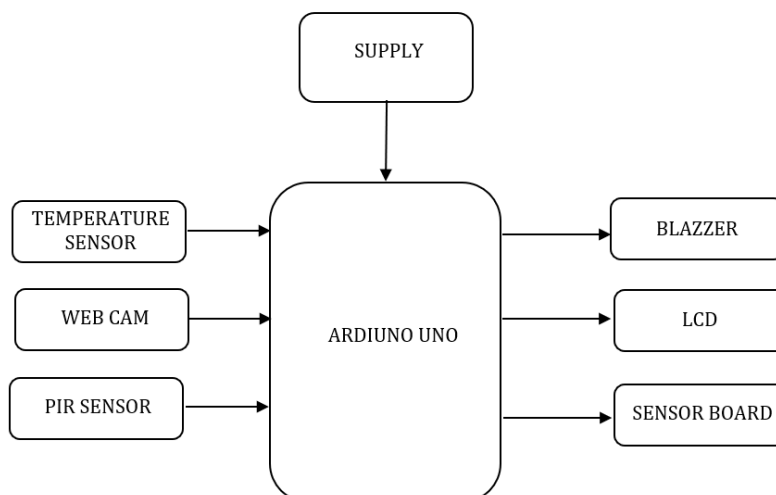
Keywords: Automatic body sanitizer, Arduino, ultrasonic sensor, PIR sensor, MLX90614, Ultrasonic Distance Sensor (HC-SR04), covid-19.

1. INTRODUCTION

Since December 2019, the globe has been in a state of extreme stress as the number of afflicted people rises daily and no vaccination has been shown to be 100% effective against the Corona Virus, the pandemic agent. Due to widespread, strict lockdown, the weaker segments of society are suffering. As the coronavirus spread around the globe, there has been a noticeable increase in the demand for hand sanitizers. When using alcohol-based hand sanitizers, apply pressure on the cap with your hands. People are prompted to touch the surface of the cap as a result, increasing the risk of infection. Because pressing the pump handle requires manual labour, many people walk by without cleaning themselves. Additionally, because everyone presses the cap in a different way, it is challenging to estimate how much is used and coordinate when to replace or refill. Sanitation has always been one of the cornerstones of warfare and, combined with the use of face masks, is the most effective way to stop the spread of the Covid-19 virus. For this aim, the majority of contemporary sanitization techniques rely on foot-operated sanitizers and sanitizer dispensers. The bulk of these, meanwhile, are not contactless, which makes it impossible to sanitise many persons.

Since fewer people really use hand sanitizers as a result, Covid-19 cannot be stopped from spreading. In order to address this issue, a prototype for an automatic hand sanitizer with temperature sensor design has been created.

1.1 BLOCK DIAGRAM



1.1.1 EXPLANATION

The project's goal is to determine whether a person is wearing a mask perfectly and to measure their body temperature; if both measurements are accurate, the door will open and automated sanitization will begin. These components include a temperature sensor and a Raspberry Pi model 3b. Additionally, we use IOT-based technology along with additional parts like buzzers, motors, and LCDs to store the data. Having both requirements immediately grants entry. To regulate every aspect of the system, a raspberry pi computer is coupled to a temperature sensor and camera..

The camera is used to check for masks and check the temperature of the forehead using temperature sensors. The raspberry analyses the sensor data and determines whether to grant access to the individual. In this instance, a motor is activated by the system to open the barrier, allowing the person to enter the building. The device flashes the red light and denies admission to a person if it detects high temperature or the absence of a mask. Additionally, a person's temperature and face are sent via IOT to a server so that authorities can test them for COVIDS.

2. DETECTION MODULE

In the second module of our suggested system, people going through it are detected as wearing masks. We applied five learned deep learning models.VGG-16, Mobile NetV2, Inception V3, ResNet-50, and Convolutional Neural Network (CNN) models are used to determine whether a face mask is worn in three different ways: properly (FWPM), incorrectly (FWIPM), and not at all (FWOM). Additionally, the N-95 and surgical masks are the two classes in which our suggested model recognizes and categorizes the many types of face masks. Transfer learning was used to fine-tune these five pre-trained models since it is quicker and simpler than starting from scratch and training a model with randomly initialized weights. Similar to this, the authors employed a deep neural network to examine vibration signals brought on by people walking on the floor in order to locate people in enormous structures. By freezing the weights and other trainable parameters in each layer such that they are not trained or changed when we input our dataset, we make the output layer of these models non-trainable. We also added a train for the output. layer to our dataset. The sole trainable layer in our new model would be the output layer.With a learning rate of 0.0001, cross entropy for our loss, and accuracy for our matrix, we employed the Adam optimizer.

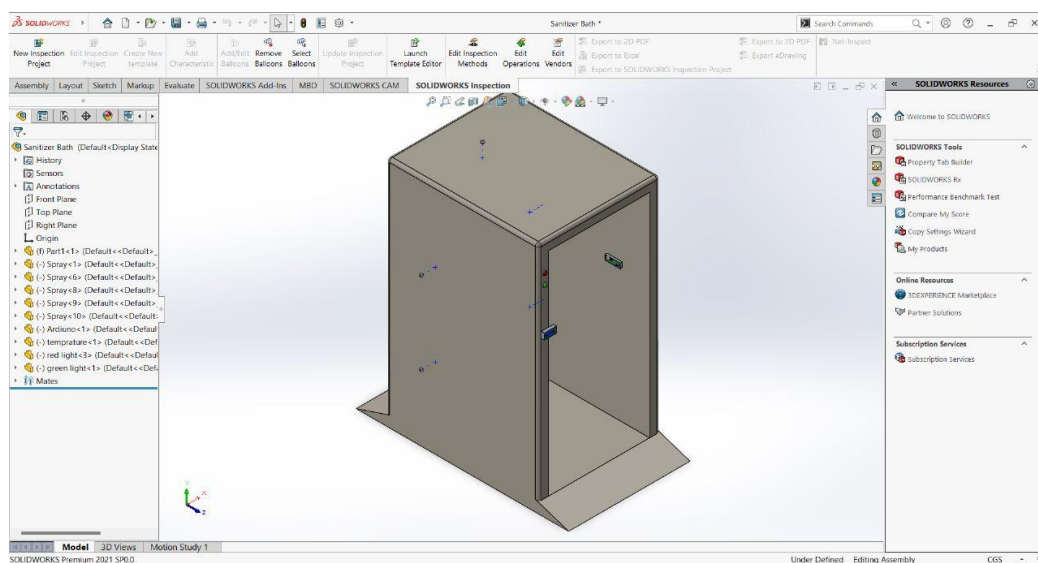
2.1 Structure

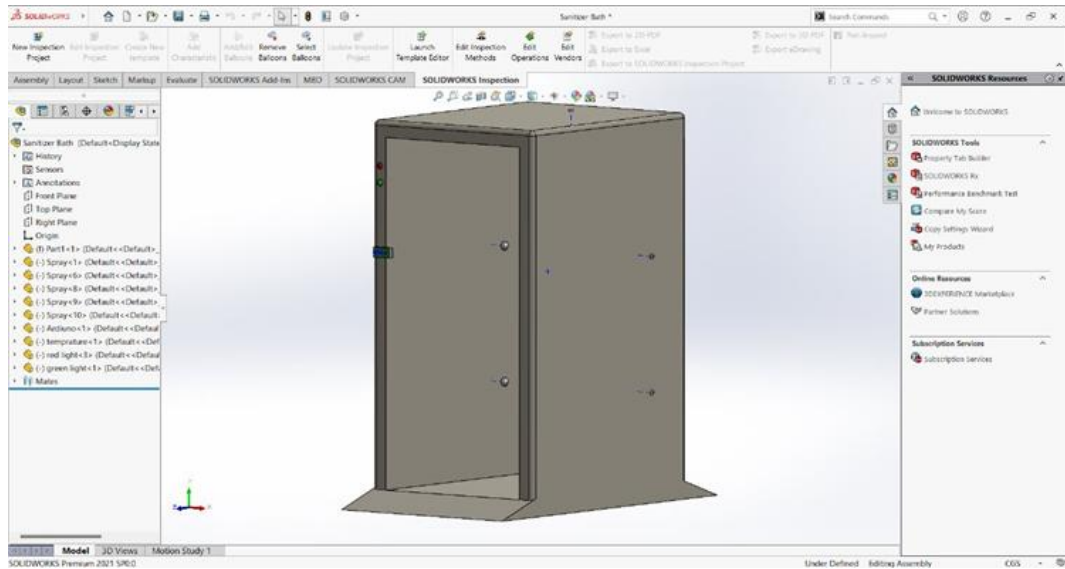
We have divided structure in 3 parts.

1. Temperature Detection
2. Mask Detection
3. Automatic Sanitization

For temperature detection MLX90614IR, APDS9960, 12C OLED , Arduino Uno, Piezo buzzer are used. Similarly for mask detection ESP32CAMY5, E18-D80NK Adjustable, LM2596 Adjustable, DC-DC convertor module, CH340G USB to TTL serial convertor and R/G Led are deployed. For the Automatic Sanitization spray PIR sensor, 12V relay, 7805IC, BC547, 12V water pump, Pneumatic (T/L) and Spray nozzle are used


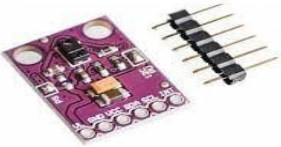

All the parts are designed and assembled in Solidworks.











Tables


Temperature Detection Components

Name	Specification	Component Image
MLX 90614 IR	The MLX90614 is an infrared thermometer for non-contact temperature measurements. Both the IR sensitive thermopile detector chip and the signal conditioning ASIC are integrated in the same TO-39 can.	
APDS-9960	The APDS-9960 device features advanced Gesture detection, Proximity detection, Digital Ambient Light Sense (ALS) and Color Sense (RGBC). The slim modular package, L 3.94 × W 2.36 × H 1.35 mm.	
I2C OLED	The I2C address for this OLED display is 0x3C , NOT 0x78, or 0x7A as printed on the back of the OLED board. Please remember to modify the address in your code to 0x3C in order to communicate with it.	

<p>ARDIUNO UNO</p>	<p>The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc and initially released in 2010.</p>	
<p>Piezo Buzzer</p>	<p>A piezo buzzer is a type of electronic device that's used to produce a tone, alarm or sound. It's lightweight with a simple construction, and it's typically a low-cost product.</p>	


Mask Detection Components

Name	Specification	Component Image
<p>ESP 32 CAM wifi</p>	<p>The ESP32 CAM WiFi Module Bluetooth with OV2640 Camera Module 2MP For Face Recognition has a very competitive small-size camera module that can operate independently as a minimum system with a footprint of only 40 x 27 mm</p>	
<p>E18- D80NK Adjustable</p>	<p>The sensor has a detection range of 3-80cm. The Adjustable Infrared Sensor Switch is small, easy to use, inexpensive, easy to assemble and can be widely used in a robot to avoid obstacles, interactive media, industrial assembly lines, and many other occasions.</p>	
<p>Tower ProMG995 Servo Motor (180 deg)</p>	<p>Unlike other motors, servos have a limited range of rotation, usually half way around a circle (180 degrees). A servo can be told at what angle to turn to so movements can be controlled by the user.</p>	
<p>LM 2596 Adjustable DC-DC Converter Module</p>	<p>DC-DC Buck Converter Step Down Module LM2596 Power Supply is a step-down(buck) switching regulator, capable of driving a 3-A load with excellent line and load regulation. These devices are available in fixed output voltages of 3.3 V, 5 V, 12 V, and an adjustable output version.</p>	

10mm LED (R/G)	10mm LEDs are the largest of the LED group and have a large lens that produces a wide angle beam, are great for custom installations in which an extremely bright and wide angle light is needed.	
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Auto Sanitization Spray Components

Name	Specification	Components Image
PIR Sensor	PIR sensors are used in thermal sensing applications, such as security and motion detection . They are commonly used in security alarms, motion detection alarms, and automatic lighting applications.	
7805 IC	7805 Voltage Regulator, a member of the 78xx series of fixed linear voltage regulators used to maintain such fluctuations, is a popular voltage regulator integrated circuit (IC).	
Water Pump(12V)	This DC 12V Mini Submersible Noiseless Water Pump is a low cost, small size Submersible Pump Motor which can be operated from a 12V power supply . It can take up to 120 liters per hour with a very low current consumption of 220mA.	
Pneumatic (T/L)	Pneumatic fittings are parts used to connect sections of pipe, tube, and hose in pneumatic (pressurized gas) systems .	

Spray Nozzle	A spray nozzle is a simple device used to break apart a fluid flow into a spray pattern . Despite the apparent simplicity of nozzles there are a very large number of different products in our range reflecting the multitude of ways different industries need to spray various fluids.	
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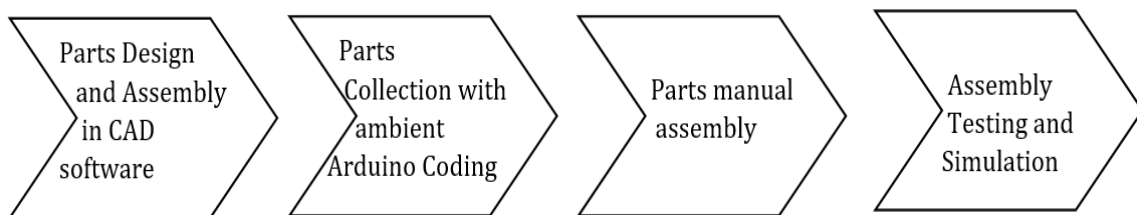
Proposed System

The proposed system makes the sanitization completely automated with successfully avoiding human contact and thus reducing chances of being affected by virus. It additionally uses mask detection system which only lets you pass if one is wearing mask. It also collects the temperature data of the subjects which can be further used.

Way to Approach

- 1) Temperature Detection
- 2) Mask Detection
- 3) Auto Sanitization

Path



Application

- Hospital Entrance.
- Handless Temperature detection in Malls.
- College Gate Entrance.
- Governments/Private Security Checks.

Conclusion

COVID-19 has become a pandemic and is spreading rapidly through direct and indirect contact between people. Manual temperature and disinfection systems are used in homes and public places for disinfection, but these systems may contribute to the spread of COVID-19 infection. This virus will remain in our lives, and we will have to live with it, but we must take strict precautions to break the virus's chain. This study aims to prevent and reduce the spread of COVID-19 by preventing and minimizing local transmission carriers. Our proposed model is a feasible method for rapidly screening and disinfecting a large number of people using an automated system. The modules of our proposed system measure temperature in a contact-free manner and detect whether or not a person is wearing a face mask, which can play a critical role in controlling and tracing the person suspected of COVID19. Our proposed system's modules produced very impressive results, demonstrating that Smart Screening and Disinfection Walk through Gate can help control local transmission and defeat this novel COVID-19 pandemic.

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