

IOT BASED AUTOMATIC HAND SANITIZER DISPENSER

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ABSTRACT

Hand sanitizer dispensing machine is automated, non contact, alcohol based hand sanitizer dispenser, which find it's used in hospital, workplace, office, dispenser, which finds it's use in hospitals, work places, offices, schools and much more. Alcohol is basically a solvent, and also a very good disinfectant when compared to liquid soap or solid soap, also it does not need water to wash off since it is volatile and vaporizes instantly after application to hands. It is also proven that a concentration of >70% alcohol can kill Coronavirus in hands. Here, an ultrasonic sensor senses the hand placed near it, the Arduino uno is used as a microcontroller, which senses the distance and the result is the pump running to pump out the hand sanitizer. The IR Sensor is the photodiode used for sensing the human hand detection and it is used to control the motor pump from the liquid. The motor is connected to an RC timer delay setup and the pipe connected to a reducer are used to control the flowing liquid of the sanitizer. It has three modes of Control LED's in the system, White LED is used for the user to understand that the setup is in working mode and battery is in use.

Keywords: Automatic Hand Wash Sanitizer, Coronavirus, Relay Ultrasonic Sensor, Relay, Sanitizer, Touchless Half Wash Dispenser, Ultrasonic Sensor.

I. INTRODUCTION

The corona disease is a major problem future world. Presently there is no medicine or vaccine found in the recent world as there is a sever attack in in this world, the people are suffering from the corona disease. The corona disease is not a simple virus attack, it makes severe to the human by infecting the respiratory system. The virus disease is heavily spreading in the world, as the nations are trying to monitor and maintain the spread of corona in the nation and other nations. The world is suffering a lot due to this corona virus. There is a strict evaluation everywhere to control the corona disease and spread to the nation. The hospital and the nurse people are suffering to cure the affected people and stop spreading the virus to the neighbouring people.

As there is an impact in using the hand wash sanitation by foot or by pressing the sanitizer bottle used to have a spread of the virus disease from one human to another. A long press is made with the footer, such that the mechanical forced to spray out the Sanitizer liquid. The human at aged people is unable to use this system as there is mechanical stress and there the corona virus disease is a major problem in the future is a sudden liquid force coming from the sanitizer bottle



Fig.1 a): Foot Operated Hand Wash Sanitizer

The Easy Non-Contact Automatic Hand Sanitizer Dispenser or Automatic Soap Dispenser with Arduino, it has the Arduino microcontroller to control the sanitizer liquid with the help of a Servo motor. This is used to power up the system by the external power supply of 6V battery or through computer USB cable. This method is good to use and the drawback is the battery replacement for the usage of the system.

The mask and sanitizers provided anywhere to protect the people from spreading the virus and to kill the virus from the human hand. The virus is spreading from the human hand and mouth saliva. The mouth spread is controlled with the mask cloth and the human hand is controlled by the hand wash sanitizer. The hand touch while pressing the dispenser usage also spreads from human to human. There should be an automatic hand wash sanitizer dispenser, to control and maintain the spread from human to human.

II. LITERATURE SURVEY

A literature survey on IoT-based automatic hand sanitizers reveals significant advancements and future potential in this technology. These devices utilize IoT technology to enhance hand hygiene practices, especially crucial in preventing disease transmission, as highlighted during the COVID-19 pandemic. Current implementations in hospitals, schools, offices, and public spaces demonstrate their effectiveness and convenience. Key components include sensors for detecting hand presence, connectivity technologies like Wi-Fi and Bluetooth, and data analytics for monitoring usage and maintenance. Benefits include improved efficiency, real-time monitoring, and data-driven insights for optimizing hygiene practices. However, challenges such as connectivity issues, sensor accuracy, data privacy, security, and cost must be addressed. Research studies indicate positive user feedback, increased adoption, and significant behavioral changes towards better hygiene practices. Future prospects include advancements in sensor technology, integration with broader health systems, and sustainability initiatives to make these devices more eco-friendly and energy-efficient. Despite the challenges, the potential long-term impact of IoT-based hand sanitizers on public health and hygiene is substantial, making it a promising area for further research and innovation.

RELATED WORK

The patients were also given about 4.25 ounce containers of hand sanitizer alongside their beds. 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 seminar also showed the effectiveness of the alcohol based hand sanitizers, which reduced infection rates by whopping 30%. In the seminar mainly says about the hospital grasped infections, which is about 2 Million Patients per year and That also says that it is 8 leading cause for deaths annually in USA. The paper says about the injection caused by drug resistant microorganisms which causes death rate and also complications, the multi drugs resistant pseudomonas aeruginosa MDRP which are very common worldwide. Several antibiotics have increasing multidrug bacteria isolation rate, even personal protection equipment (PPE) can't be efftin isolation rate of MSRA. They used hand sanitizers with 60 to 70 percent ethanol or isopropanol for reducing significant number of pathogens. Hence they emphasis about the alcohol based hand sanitizer since the alcohol based hand sanitizer had negative association with MRSA isolation rate which, means that hand hygiene is very important in hospital. The seminar say about emergence of the normal corona virus (SARS-CoV-2) which has cause unexpected challenge to health of the people of this world.

III. METHODOLOGY

Block Diagram of Proposed System

The automatic hand sanitizer works using the ultrasonic sensor to check the presence of hands below the outlet of the sanitizer machine. It will continuously calculate the distance between the sanitizer outlet and hand and sends a signal to the Arduino to turn on the pump whenever the distance is less than 15 cm to push the sanitizer out. It controls a mini DC submersible pump detecting the movement of the hand with the help of an ultrasonic sensor and pumps the sanitizer - other information can be seen through the LCD. The block diagram will give us an idea how to develop a touch-free hand sanitizer.

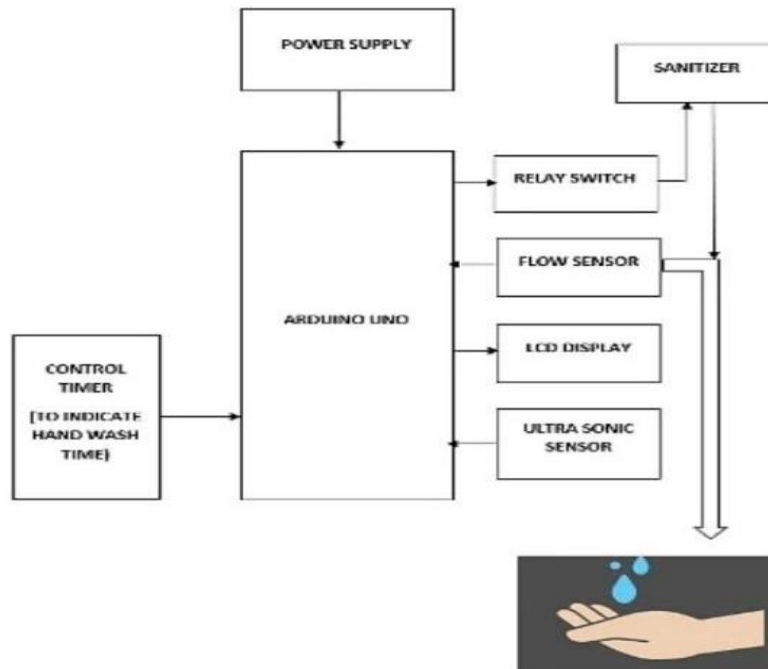


Fig.1: Block Diagram of Automatic Hand Sanitizer Dispenser

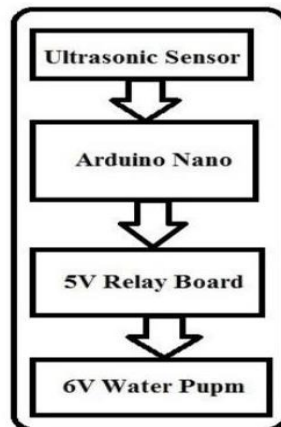


Fig 2. Block Diagram

Working

The Ultrasonic sensor has an echo and trig pins which are the receiver and transmitter respectively, by the algorithms the sensor is adjusted to get trigger within the particular distance, when the hand is placed in the required distance, the sensor send the signals to the Arduino nano then the Arduino sends signal to the 5V relay board, which is triggered and activate the motor to pump sanitizer.

• **Ultrasonic sensor/ IR sensor**

Ultrasonic sensor used sound Waves to measure how far away you are from object ultrasonic sensor provide more accurate and more reliable data. For accurate, Numerical representation of distance then ultrasonic sensor is more accurate. Ultrasonic sensor use sound wave to transmit and receive information over the duration. The duration is then converted to a distance measurement based on the speed of sound (340m/s).



Fig.3: Ultrasonic Sensor

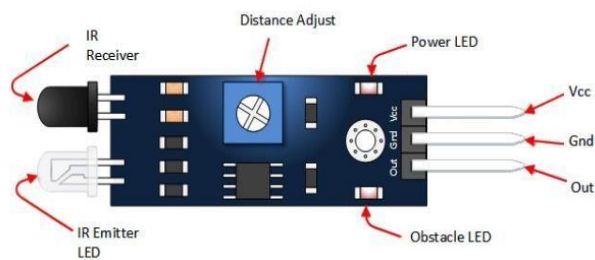


Fig.4: IR Sensor

IR sensor used infrared light to determine whether or not an object is present. If you only need to know if an object is present or not, then an IR sensor is easier to implement. IR sensor uses an infrared transmitter and receiver to emit and detect objects.

Advantages

- (i) It is Non contactable.
- (ii) Protect from COVID 19.
- (iii) Infrared sensor technology.
- (iv) Design is compact. (v) Easy wall mounted installation
- (vi) Available in different sizes.
- (vii) User friendly.
- (viii) Maintenance is low.

5.4: Disadvantages

- (i) Dry skin
- (ii) Fire hazards

5.5: Applications

- (i) It can be used hospitals.
- (ii) Used in public locations
- (iii) Also used in School & colleges
- (iv) Use in Airports.
- (v) Used in hotel and restaurants.
- (vi) Shopping malls.
- (vii) Banks.

IV. FUTURE SCOPE

The future scope of IoT-based automatic hand sanitizers is promising, driven by the increasing emphasis on hygiene and the integration of IoT technology across various domains. Smart monitoring and management capabilities will allow real-time tracking of usage, inventory, and maintenance needs, ensuring dispensers are always functional and stocked. In healthcare settings, these systems can integrate with health data platforms to monitor hygiene practices and ensure compliance with protocols. Enhanced user experiences may include adjustable dispensing amounts and personalized feedback through connected apps. Security features, such as biometric integration and user authentication, can ensure that individuals sanitize their hands before accessing sensitive areas. Sustainability will be a focus, with eco-friendly materials and energy-efficient designs reducing environmental impact. During health crises, IoT-enabled sanitizers can be rapidly deployed and scaled to meet public health needs, while data sharing with authorities can aid in outbreak monitoring and response. Interoperability with other smart building systems will enable a comprehensive approach to hygiene, and advanced technologies like AI and blockchain will further optimize performance and ensure data security. Overall, IoT-based automatic hand sanitizers are set to become more efficient, user-friendly, and integral to modern health and safety standards.

V. CONCLUSION

Implementing of Contactless Automatic Hand Wash Dispenser for Sanitation is efficient and the cost price is minimized. It works like the normal contactless automatic machine. The human gets the limited sanitizer liquid for sanitation in hand, to wash the hands and to protect themselves from the corona disease. This system can be utilized in malls, high populated areas. The economic cost of the seminar, it will be better quality when considering the life of the system and the seminar. The most goal of this seminar was to use current advanced technologies to develop an Automatic hand sanitizing machine to improve hygiene and prevent the infectious viruses entering our body. Automatic hand sanitizers are priced less when compared to any other hand sanitizing tools or dispensers. At the same time it is environment friendly as because the disposable wastage is very minimal, since it can be refilled easily without any technical assistance. These automatic hand sanitizer machines are developed keeping in mind about its affordability by underprivileged sections of the society as it can be purchased by lower income groups in pursuit of their well being and also they are easily available and can be used by everyone without any hassle.

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