

Electrobot Hand Disinfection Dispenser with IoT

Raashi Shah¹, Priyanka Shikdar¹, Anuja Shinde¹, Prof. Varsha Karambelkar²

¹Electronics and Telecommunication, Bharati Vidyapeeths College of Engineering for Women,
Pune, Maharashtra, India

²Assistant Professor, Electronics and Telecommunication, Bharati Vidyapeeths College of Engineering for
Women , Pune, Maharashtra, India

ABSTRACT

Article Info

Volume 8, Issue 4

Page Number: 06-10

Publication Issue :

July-August-2021

Article History

Accepted : 20 June 2021

Published: 02 July 2021

Hand hygiene is most important as it may get contaminated easily from direct contact with airborne micro-organism droplets from coughs and sneezes. In this situation of Covid-19 outbreak, it is extremely important to break the transmission chain of the Covid-19 virus by doing the proper hand sanitization. It can be achieved by strict contact isolation and strict infection control tool by maintaining good hand hygiene in public places and in hospitals. The achievement of the hand sanitization slowly depends on the use of effective hand disinfectant formulated in various types and forms such as antiseptic liquid soaps, water-based or alcohol-based hand sanitizer, with the hindmost being widely used in hospital and public places. Recently, most of the effectual hand sanitizer products are alcohol-based formulations containing 63%–94% of alcohol as it can denaturalize the proteins of microbes and the ability to inactivate viruses. This structured review correlated with the data available in PubMed and it will overlook the range of available hand sanitizers and their efficacy as well as the formulation feature, adverse result, and advise to enhance the formulation efficiency and safety. Further, this article highlights the efficiency of alcohol-based hand sanitizer against the coronavirus.

Keywords : Sanitizer, Viruses, Coronavirus, Hand, Hospital

I. INTRODUCTION

The world is dealing a medical crisis and the CoViD-19 pandemic and the role of appropriate hygiene and hand sanitizers is unavoidable in controlling the spread of infection in public area and healthcare organization[1]. There has been a great surge in call for hand sanitization products leading to scarcity in their supply. A consequential increase of substandard

products in the market has uplifted safety concerns. This article, therefore ,presents a censorious review of hand sanitization approaches and products available on the market in light of the scientific verification available to date[2]. This article also provides a range of hand sanitizer product formulations, and manufacturing instructions to allow for extemporary preparations at the community and hospital pharmacies during this crucial crisis. In addition, this

critical situation is expected to continue, so hand sanitizers will be in demand for an extended period, and the availability and purchase of products on the market create an ongoing safety concern. Therefore, this review shall also provide various commercial institutes, interested in stepping forward the production and marketing of hand sanitizers, with a reference on the development of products of standardized ingredients and formulations.

The disclosure of the COVID-19 (Coronavirus Disease-2019) pandemic has risen to be a significant global and public health concern and led to boundless and large use of hand disinfectants given its epidemic nature. There was a total of 3.8 million reported cases of the patients acting over 200 countries worldwide as of 7 May 2020 COVID-19 is an infectious and most infective disease caused by the most severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which can persist or carry on . And remain infective on surfaces for up to 9 days . The recent study reveals that this virus which is SARS-CoV-2 is possible in the form of aerosol and fomite, and the virus can remain infective in aerosols for hours and on surfaces up to some days, that is depending on the inoculum shed . Hence, it is very crucial and dangerous to interrupt the challenging chain of the virus through contact isolation and strict infection control tools . The face masks, appropriate hand hygiene and safety is of utmost importance as hands may be contaminated from direct contact with patients. Demand for hand sanitizers has been surged as the coronavirus had break out and spread around all the countries.

Alcohol liquid hand sanitizers are usually used by squirting the sanitizer liquid when a person presses a pump with their hand. This may cause many people to come into contact with the pump handle again and again , which increases the risk of viral transmission and which is not safe. Pressing the pump handle is troublesome, and many of them pass by without

disinfecting their hands. However , each person presses the pump handle separately, making it very tough to predict the amount of liquid used and to manage refills and replacements[4]. Therefore for this reason, the actual use of hand sanitizers is been reduced, which does not help prevent spread of the virus and which is not safe.

Some hand sanitizers which are in the market are automatically pumped. However, as the sanitizer containers and pump devices are designed to be adaptable to products produced by the same manufacturer and also the customers should repurchase the container for liquid if they want to replace the hand sanitizer[5] .And also it is not economical and it has a negative impact and harmful effect on the environment by increasing waste emissions and exhalation. Also adding up , some of the users may think that it is a nuisance to buy a hand sanitizer-containing device-compatible ,suitable and adaptable again, so they pour other hand sanitizers into previously used containers and reuse and save them[6]. However, sanitizers that come directly into contact with the human body or human hands are classified as medicines as well as non-medical products such as hand wash ,etc. They are protected from harm and safe to use in original containers.

II. PROPOSED SYSTEM

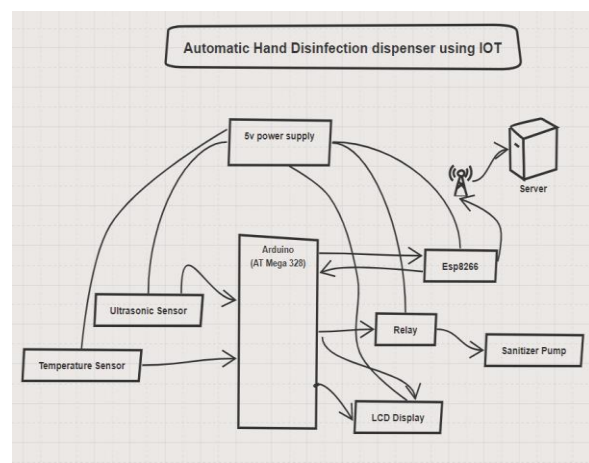


Figure 1. Block diagram of system.

System Description –

Block diagram contains various blocks. 12 v dc power supply is given to the MC as well as we use an external crystal oscillator. In this we use LM35 temperature sensor which measure the body temperature.

The measurements are given to the MC which will further forward to the wi-fi module. ESP 8266 WIFI module is used to collect the data which will further given to the cloud /server to store. In this we use 16x2 LCD display to display the message on screen. The sensor will detect the object and gives the message to the micro-controller. Micro-controller will on the relay and pump will get operated. It will dispense the sanitizer.

HARDWARE REQUIRMENTS

3.1 Arduino(AT Mega 328) Microcontroller

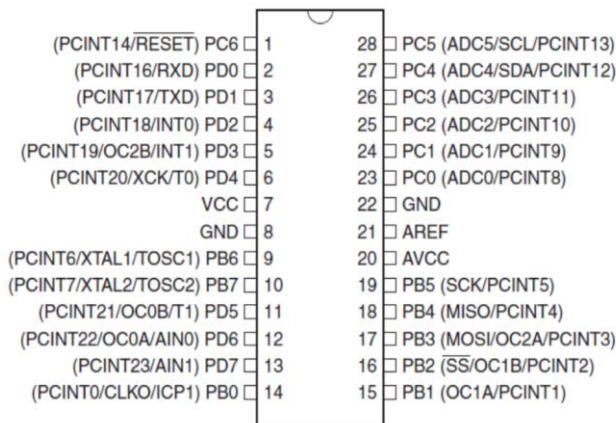


Figure 2. AT Mega328 microcontroller

- High Performance, Low Power AVR® 8-Bit microcontroller.
- Advanced RISC Architecture.
- Peripheral Features.
- Two 8-bit Timer/Counters with separate prescaler and Compare Mode.
- One 16-bit Timer/Counter with Separate prescaler, Compare Mode, and Capture Mode.
- Special Microcontroller Features

- Power-on Reset and Programmable Brown-out Detection.

3.2 Ultrasonic Sensor



HC-SR04

Figure3. Ultrasonic Sensor

- Ultrasonic sensor are used to determine the distance between the object and it's closest path.
- How ultrasonic sensor do this work? Ultrasonic sensors are basically sound sensors, but they are operate at higher frequency than the human hearing.
- The sensor releases a sound wave at a specific frequency. It then receiver for that specific sound wave to bounce off of an object and come back.
- The sensor keeps track of the time between sending and receiving the sound wave

3.3 Temperature Sensor(MLX90614):



Figure 4. MLX90614

- The MLX90614 is a Contactless Infrared (IR) Digital Temperature Sensor that can be used to measure the temperature.

-The sensor uses IR rays to measure the temperature of the object without any physical contact and communicates to the microcontroller using the I2C protocol.

3.4 LCD Display:

-Liquid crystal display is an electronic device for displaying an physical quantity.

-A 16x2 LCD contains 16 characters per line and it includes 2 such lines.



Figure 5. LCD Display

-LCD contains the data register and command register.

-Command register stores various commands given to the display. Data register stores data to be displayed.

3.5 Relay:



Figure 6. SPDT Relay

-The single pole double throw (SPDT) 30A relay is an high quality throw relay.

-The Relay include a coil, normally closed and normally open terminal.

-When the coil of the relay is at rest, the common terminal and the normally closed terminal have continuity.

-When the input given to the coil it will energized and both terminal (normally open and normally closed) are connected.

-This relay's coil is rated up to 5V and the contact is rated up to 30A you can use it to control high current devices.

III. RESULT AND ANALYSIS

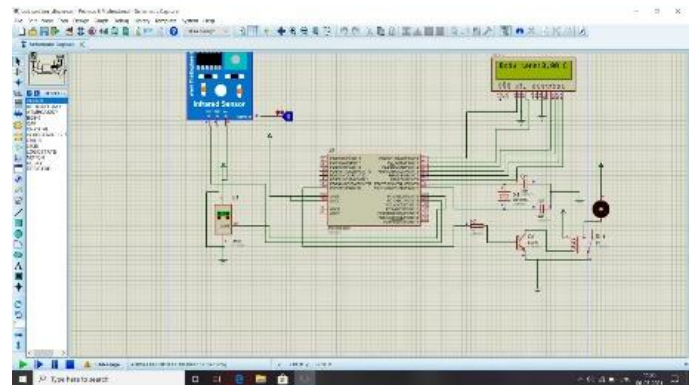


Figure 7. Simulation Design of system

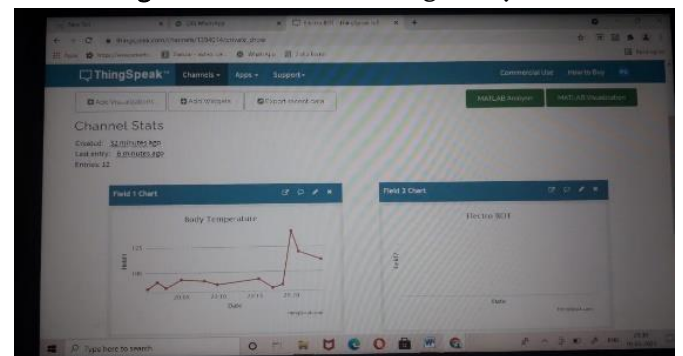


Figure 8. Thingspeak.com Data

4.1 Simulation diagram designed in proteus.

Hence in simulation result the temperature is displayed and the data is stored on cloud/sever.

-The final fabrication of Electrobot hand disinfection dispenser using IOT.

IV. HARDWARE RESULTS

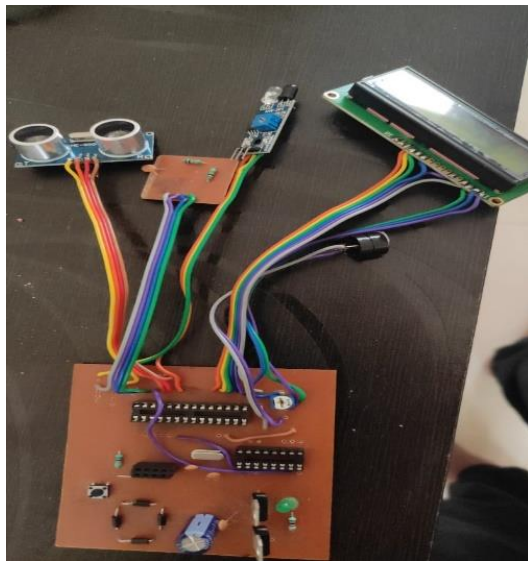


Figure 9. Hardware results of system

V. CONCLUSION

Hand sanitizers usually operate by spraying sanitizer liquid when one presses a pump with one's hand. Some hand sanitizers usually operate by squirting sanitizer liquid when one presses a pump with one's hand. Some hand sanitizers in the market are automatically pumped. However, sanitizer dispensers and pump devices are designed to be compatible only between products produced by the same manufacturer. To solve this problem, we have designed an automatic hand sanitizer system that is compatible with various dispenser. With the help of designed device, it is possible to avoid many people coming into contact with the pump handle, thus preventing viral transmission and making the use of hand sanitizer is much more convenient. Moreover, the system spray a certain amount of hand sanitizer at all times, making it easy to manage refills and replacement. Further, it can operate easily with various designs of sanitizer containers, so customers do not need repurchase a container for the liquid if they replace the hand sanitizer. Thus, it is economical as well as eco-friendly by decreasing waste emissions. The Electrobot hand disinfection dispenser machine

proposed by this paper is ultimately expected to contribute to contactless hand disinfection in public places and virus infection prevention.

VI. REFERENCES

- [1]. COVID-19 Coronavirus 2019-nCov Statistics Update (Live): 4,122,912 Cases and 280,337 Deaths. Available online:<https://virusncov.com/> (accessed on 8May 2020).
- [2]. Situation Update Worldwide, as of 7 May 2020. Available online: <https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases> (accessed on 7 May 2020).
- [3]. Kampf, G.; Todt, D.; Pfaender, S.; Steinmann, E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J. Hosp. Infect.* 2020, 104, 246–251. [CrossRefPubMed](#)]
- [4]. Chan, J.F.W.; Yuan, S.; Kok, K.H.; To, K.K.W.; Chu, H.; Yang, J.; Xing, F.; Liu, J.; Yip, C.C.Y.; Poon, R.W.S.; et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: A study of a family cluster. *Lancet* 2020, 395, 514–523. [CrossRef](#)]
- [5]. Van Doremalen, N.; Bushmaker, T.; Morris, D.H.; Holbrook, M.G.; Gamble, A.; Williamson, B.N.; Tamin, A.; Harcourt, J.L.; Thornburg, N.J.; Gerber, S.I.; et al. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *N. Engl. J. Med.* 2020, 382, 1564–1567. [CrossRefPubMed](#)]
- [6]. Thomas, Y.; Boquete-Suter, P.; Koch, D.; Pittet, D.; Kaiser, L. Survival of influenza virus on human fingers. *Clin. Microbiol. Infect.* 2014, 20, O58–O64. [CrossRefPubMed](#)]

Cite this article as :

Raashi Shah, Priyanka Shikdar, Anuja Shinde, Prof. Varsha Karambelkar, "Electrobot Hand Disinfection Dispenser with IoT", *International Journal of Scientific Research in Science, Engineering and Technology (IJSRSET)*, Online ISSN : 2394-4099, Print ISSN : 2395-1990, Volume 8 Issue 4, pp. 06-10, July-August 2021.

Journal URL : <https://ijsrset.com/IJSRSET21845>