

Touchless Embedded Design of Automation Dispenser System for Prevention of COVID-19

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Abstract –

An automatic hand sanitizer dispensing machine consist of four circuits that is hand sanitizer tank, liquid hand soap tank, drinking water tank, normal water tank is automated, non-contact, alcohol- based hand sanitizer dispenser, which finds its use in hospitals, workplaces, 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 greater than 70% alcohol can kill Coronavirus in hands. Here, an ultrasonic sensor senses the hand placed near it, the Atmega8 is used as a microcontroller, which senses the distance and the result is the pump running to pump out the hand sanitizer.

Keywords-COVID-19, hand sanitizer, Atmega8A, microcontroller.

I. INTRODUCTION

The hand sanitizer is an exceptional bit of late innovation during 19th century. Alcohol based hand sanitizer were developed during 1960's nevertheless increased broad prominence during 1990's the point at which a few influenza pandemics spread over the globe. The contaminations are spread principally through skin-to-skin contact. In this current situation of pandemic is healthy sanitizing habits, yet the fundamental issue is that manner in which we do it, that is by the physical touch to the container which doesn't fulfill purpose. Therefore, by utilizing ultrasonic sensor movement, automatic hand sanitizer can give better solution for hygienic hand cleanliness. An automatic hand sanitizer gadget can be set in any area and effortlessly moved when required. Sanitization means cleaning or sterilizing an object or body part like hands or whole body. Sanitization can be done in many ways including UV Sanitization, Soap Sanitization, Alcohol Sanitization, Bleach Sanitization and so on. The above methods, alcohol was found to be more useful for human beings since it is harmless on skin surface, vaporizes easily and kills most of the viruses, bacteria, and also removes dirt in our hands. Alcohol may be expensive for mass scale sanitization of buildings or rooms and a major disadvantage is that, alcohol is highly inflammable and requires careful storage to avoid catastrophe. Alcohol also makes hands dry since it absorbs moisture, and hence also needs addition of moisturizers.

II. LITERATURE REVIEW

In [1], the 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 hand washing 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% ethanol or for reducing significant number of pathogens. The patients were also given about 4.25-

ounce containers of hand sanitizer alongside their beds. For 10-month period of using hand sanitizers showed a result of 36.1% infection reduction. Causes increase in death rate and also complications, the multidrug resistant bacteria include Methicillin Resistant Staphylococcus aureus (MRSA), Extended Spectrum Beta-lactamase (ESBL) producing bacteria, Multidrug Resistant Pseudomonas aeruginosa (MDRP), which are very common worldwide. In [2], the paper says about the infection caused by drug resistant about the micro-organisms which 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. In [3], the paper says about the emergence of the novel Coronavirus (SARS-CoV-2), which has caused unexpected challenges to health of the people of this world, the paper also aims at reducing the transmission rate of the disease. The paper explains about the virus structure and how is it different from that of the bacterial structure, which means that virus has single stranded or double stranded RNA or DNA encapsulated in 'capsid' and virus can replicate only in presence of a host and described as 'living entities'. Bacteria also has almost the same structure including DNA or RNA along with 'Cell Membrane' and can replicate without a host. The paper also gives a complete comparison between hand sanitizers and soap, foam vs gel, and it says that high concentration of ethanol can reduce the amount of virus particle present in the hand and hence proves the effectiveness of alcohol-based hand sanitizer.

III. BLOCK DIAGRAM

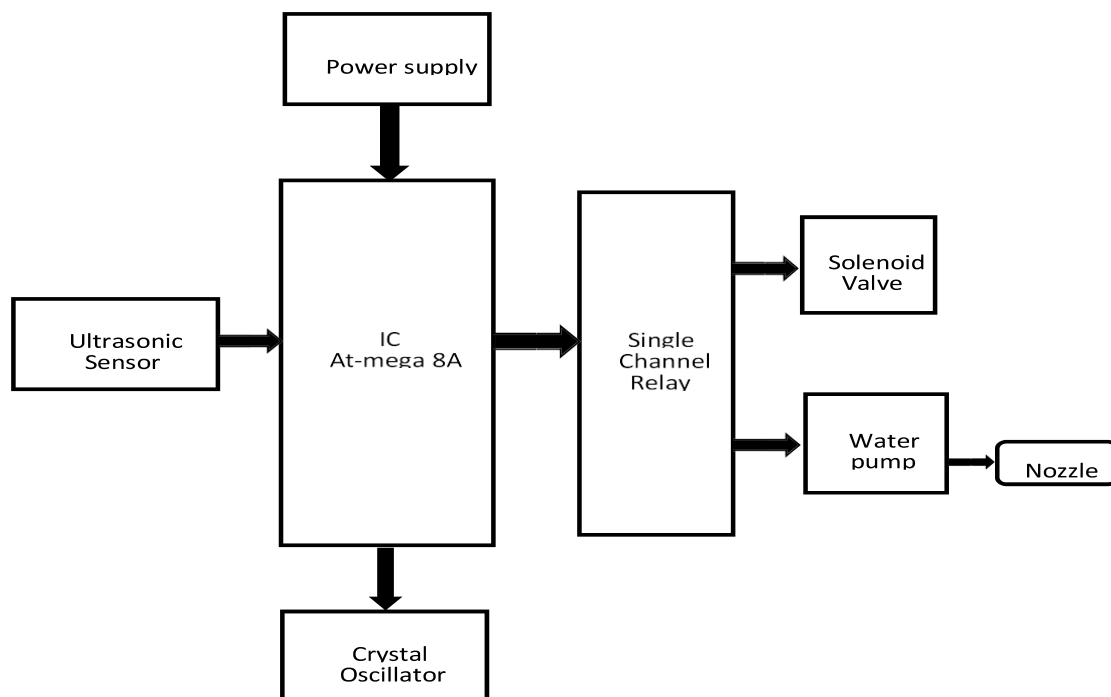


Fig.1. Block Diagram of Automatic Dispenser System

- It is an 8-bit CMOS technology-based microcontroller based to AVR family of microcontroller.
- At mega 8A microcontroller used since it is easy to program it has inbuilt ADC, DAC.
- Input to the at mega is given to an ultrasonic sensor which is used to sense the distance.

- It emits the ultrasonic frequency from one side and the notes time taken by sound wave to get reflected back.
- when the sensor senses the hand, at a distance less than 7 cm from the sensor, the at mega gives a 100 ms pulse from its digital output pin.
- The pump cannot be used directly, hence a relay is used as a switch. The relay accepts the pulse from Arduino and makes the pump run.
- The pump is 3 to 12 V submersible type, which pumps out a few drops of hand sanitizer on to the hands after pumping, the distance is sensed for every 1000 ms (1s) for scanning purposes.

4. Flow Chart of Automatic Dispenser System

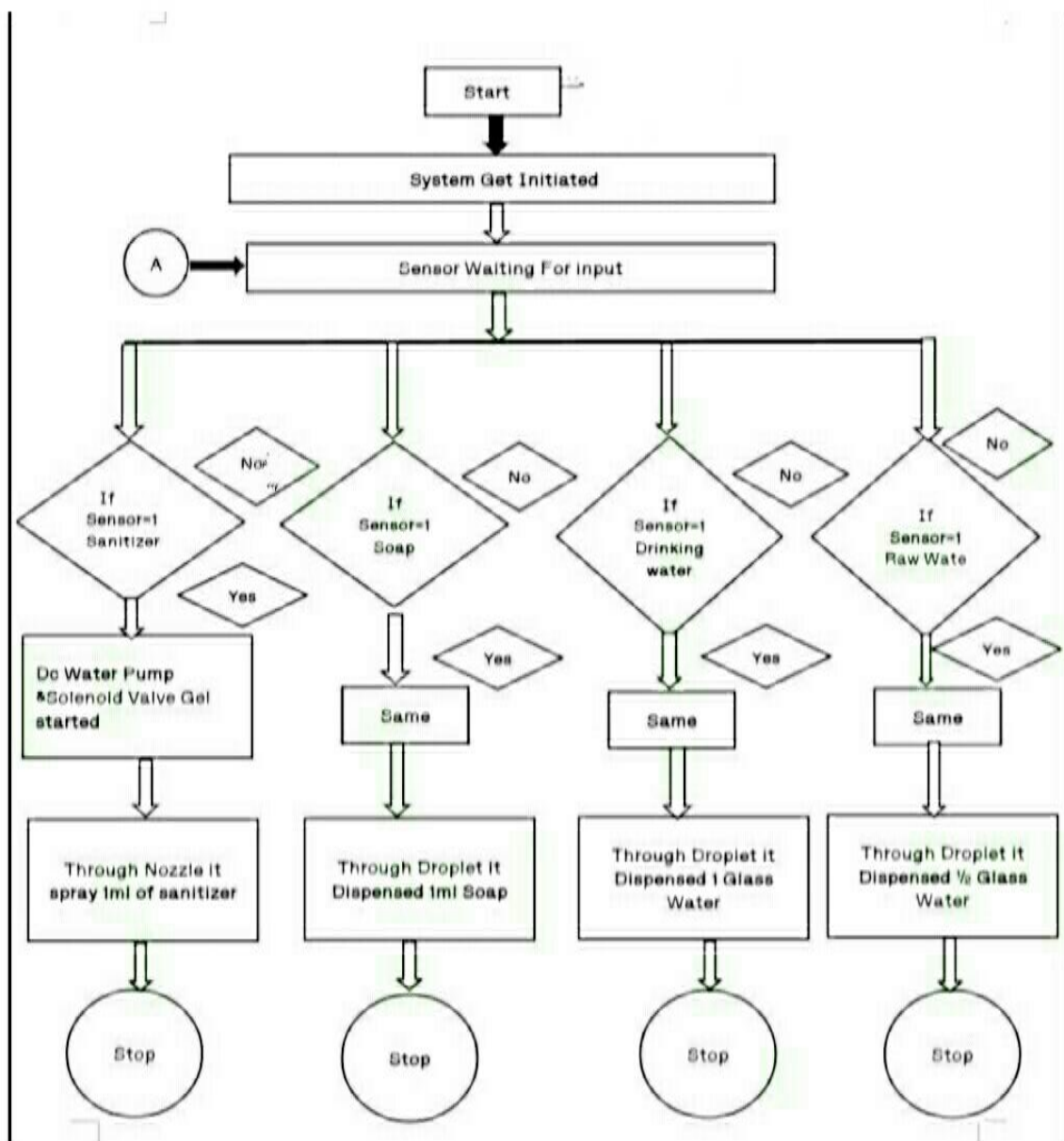


Fig.2.Flow Chart of Automatic Dispenser System

5. Project Model of Automatic Dispenser System



Fig.3 project Model



Fig.4: Result

Vi.. Advantages & Applications

Minimal Contact for Increased Sanitization

The “no-touch” component allows for minimal contact

with other surfaces, reducing spread of germs. Unlike traditional dispensers or hand-washing, a no-touch sanitizing station removes the risk of unnecessary touch by using motion sensors instead of a button to deliver a powerful sanitizing solution in one quick, convenient action.

Easy Accessibility

Whether positioned on a hand sanitizer stand or walls, no-touch hand sanitizer dispensers are a convenient way for employees to maintain hygienic control practices. They can be placed in work spaces, offices, break rooms, or areas of high traffic so employees won't be tempted to skip frequent hand washing if it entails taking a trip to a restroom or hand sanitizer station on the other side of the

facility.

Other uses

- i. Aside from hygiene, touchless fixtures reduce costs by controlling water and soap usage at your workplace.
- ii. There's no need to worry about running taps or visitors using excessive amounts of soap. You also save money by protecting your employees' well-being and minimizing productivity loss due to sickleaves.
- iii. The following factors are likely to contribute to the growth of the automatic soap dispenser market during the forecast period:
 1. Expansion of Real Estate and Hospitality Industry
 2. Increased Investment in IOT by Vendors
 3. Concerns over Hand Hygiene
 4. Trend for Smart Washrooms

Delivers a standard dose

1. One of the biggest advantages of an automatic hand sanitizer dispenser machine is that it offers standard amount that is enough to clean both hands.
2. These standardized doses are usually sprayed on the hands, which causes minimum to no wastage, unlike manual ones, which releases extra sanitizer at times.

VII. CONCLUSION

The utmost goal of this project was to use current advanced technologies to develop an automatic hand sanitizing, Soap dispenser as well as drinking and raw water dispenser machine to improve hygiene and prevent the infectious viruses entering our body. 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 Dispenser System 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. From this, we come to know that Automatic Dispenser System are more effective than soaps, and also easy to use. This also says that non-contact dispensing is again important to prevent pathogen spreading and finally, hand hygiene is most important and must be part of our daily routine.

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