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Automatic Hand Sanitizer and Thermal Scanning Machine

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ABSTRACT: In this covid-19 pandemic period which is a global outbreak, hand hygiene is the core preventive measure in the spread of the disease as advised by WHO (World Health Organization) which includes washing hands with water and soap regularly, hand sanitizing using hand sanitizers, etc. Hygiene refers to the practices conducive to maintaining health and preventing disease especially through cleanliness such as washing hands, coughing in the elbow etc. Hand washing helps to prevent any diseases that spread through contact. In order to eliminate most of the germs on the hands, one needs to apply a good hand washing practice. In most healthcare settings, alcohol-based hand sanitizers are preferable to hand washing with soap and water because it can be easily tolerated and it is also more effective at reducing bacteria. Hand sanitizer is a liquid, gel, or foam generally used to decrease infectious agents on the hands. A sanitizer is designed to kill germs on skin, objects and surfaces.

KEYWORDS: Automatic hand sanitizer, Microcontroller, Proximity sensor, IR sensors, relay, covid-19.

I. INTRODUCTION

Since December 2019 the world is under tremendous tension, the numbers are increasing day by day, and till date no vaccine has been fully proved against the pandemic agent. Yes, it is COVID-19, it was unknown to the race before it broke out in Wuhan, China. Being from a large family, a continuous mutation is occurring, forbidding the researchers, microbiologists, pharmaceuticals to draw the line of conclusion on the vaccine.

Affecting the most prestigious countries in a chain; China, Italy, Spain, USA, India, Russia, the virus has proved its strength and subservient a technologically enhanced race. The race of homo-sapiens. 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. Of 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. Alcohol based hand sanitizers are also provided with antiseptic disinfectants like Chlorohexidine Gluconate. Minimum concentration of alcohol in hand sanitizers must be greater than 70% for effectiveness against viruses. But, repeatedly touching the hand sanitizer containers to get a drop of sanitizer again initiates contact with persons, which may be risky. Hence there is need for non-contact-based hand sanitizer dispenser.

Now in India March 2021 there will be sudden increases in a COVID-19. The country has been reporting over two lakh new cases for the last four days.

The policies taken worldwide has lessened its affect to some extent but could not eradicate it. Lockdown has economically weakened many nations, and testing of different medicines has also not proven to be satisfactory. The question now prevail is Life vs. Livelihood. The weaker section of the society is facing the hardship due to vigorous lockdown across the nations. Seeing the picture of India, one of the most promising countries in technology, the labourers are rushing for a little piece of grain. The starving faces reveal the pain. Industries are in losses, workers are losing jobs, economic growth of the nation has taken a back seat, but it should be realised that a regular monitoring of body temperature and periodical hand sanitization can prevent the spread of the pandemic to the masses.

Keeping in mind, the situation worldwide, sanitization commodities should be installed in each and every corner of the sphere, be it an industry, a corporate office, an educational institute or a shopping mall.

In this research work, an automatic hand sanitizer with temperature sensing design prototype has been made.

II. RELATED WORK

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 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. For 10-month period of using hand sanitizers showed a result of 36% infection reduction.

In [2], the paper says about the infection caused by drug resistant micro-organisms which causes increase in death rate and also complications, the multidrug resistant bacteria include Methicillin Resistant Staphylococcus aureus, Extended Spectrum Beta-lactamase (ESBL) producing bacteria, Multidrug Resistant Pseudomonas aeruginosa, which are very common worldwide. 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.

In [3], the paper says about emergence of the novel Coronavirus, 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. METHODOLOGY

We build touch less sanitizer dispensing machine with special merits: -

Cabinet:

- 1] Virgin material, ABS Plastic (Recycled plastic not used)
- 2] Black Colour tank, hence no Vaporization due to any light.
- 3] No extra open hole to tank, hence no vaporization.
- 4] We use solenoid instead of motor hence no vaporization of sanitizer liquid due to mouth of outlet closed by solenoid.
- 5] 13-liter tank capacity hence 10-liter container can of sanitizer, empty any time if 3 litres already contain in tank.
- 6] We use company manufacture hole to outlet Sanitizer hence every drop of liquid we utilize and no extra hole to tank hence life of tank more.

Sensor:

We use proximity sensor highly sensitive and long range and adjustable sensitivity with 5 volts to 30-volt wide working capacity, other used 6 volt to 24-volt capacity.

PCB:

- 1] 7 ampere contact relay switches hence no maintenance.
- 2] We use Connector to replace PCB easily by unskilled person, other uses 5 amp and no connector they solder directly hence only skill technical repair it.

Technology:

- 1] 12-volt technology benefit to use this machine on solar panel or Battery.
- 2] We use standard adaptor in which Indian pin hence no sparking at socket, LED indicator indicate adaptor working hence fault detect by any one, Because of we use adaptor to rectify 50 % faults without technician.
- 3] Less maintenance and less maintenance cost.
- 4] We use standard wiring connection system to locate and remove faults easily.

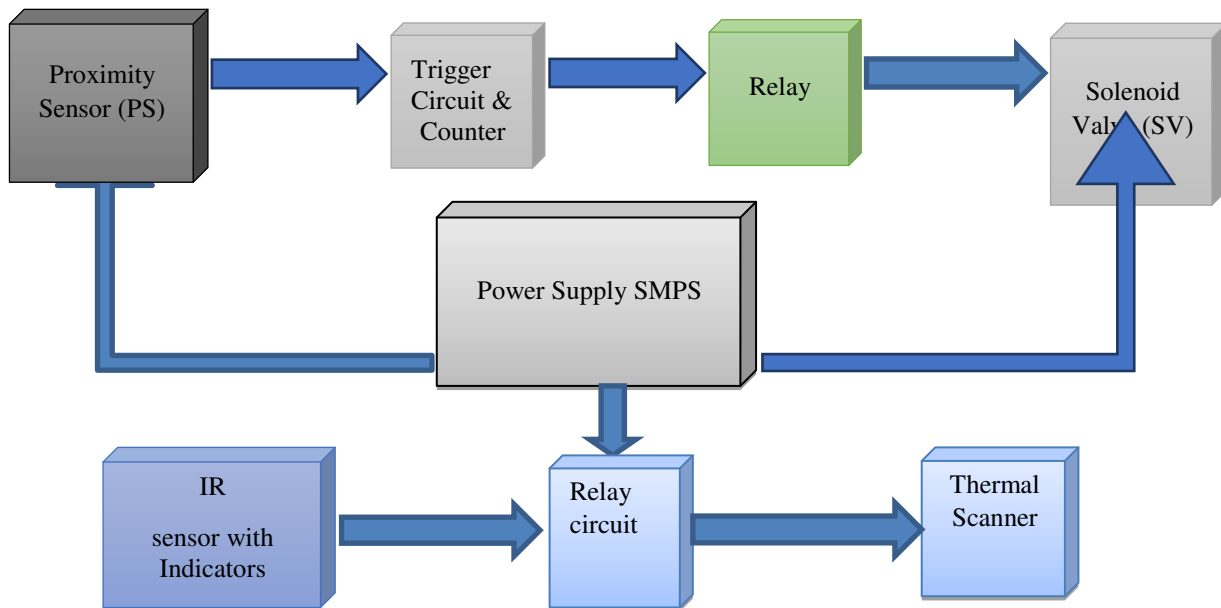
Solenoid:

Our solenoid work on 9 volts also hence in rural when power supply drops, our machine working not affected.

Features: Customer adjust one drop to several drop of sanitizer any time by setting knob control.

- 1] Volumes of buzzer sound also adjust with external control.
- 2] Easy cleaning of sanitizer tank. Tank replace from main carbonate without tools.
- 3] Hundred percent Indian product error less operation for long time
- 4] Use for full processing hotel, school, college, office, hospital.

Block Diagram of Auto Sanitizer & Thermal Scanner System:



IV. EXPEIMENTAL RESULT

In the above paper, Arduino is used as a microcontroller for calculating the distance between the sensor and the hand placed below it. If it is less than 7cm, then pump runs for 100ms through a relay and pumps out few mL of liquid alcohol-based hand sanitizer and also senses the distance for every 1000ms. Components like pump, relay, Arduino microcontroller were tested. With the help of this system we confirm how many persons sanitized and adequate sanitizer utilize with one time setting.

V. CONCLUSION

From the above paper, we come to know that alcohol-based hand sanitizers are more effective than soaps, and also easy to use. The paper 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 life. This hand sanitizing machine is more efficient than the regular hand sanitizing machine and the more effective technology is used.

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