DRY HAND WASHING MACHINE USING FOG DISINFECTION

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Introduction:

An automatic hand sanitizer dispensing machine is automated, non-contact, alcohol based hand sanitizer dispenser, which finds its 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. Disinfecting our hands from time to time is a very important factor in fighting the pandemic. But does it actually require so much water to disinfect your hands. Additionally, many people actually end up over washing their hands (over 15- 20 seconds with full tap released). Disinfection actually just requires that water reaches every millimetre of your hand along with a disinfectant or soap and it should be just enough to kill any infection or help it slide out of your hand. When we turn on a tap only 10 – 30%water actually touches our skin and rest just flows over this first layer of water.

Objective:

Our main objective is to prevent infectious diseases like COVID-19 through automated systems as it is said, prevention is better than cure. Disinfection by fogging is a novel and successful technique. Due to the smaller particle size of a fog (which may be regulated with available equipment), it has more flexibility and entry to deeper surfaces. This results in a more thorough and efficient disinfection than spraying liquids, which is why fogging is preferred. It is possible to disinfect vast areas, such as hospitals, nursing homes, quarantine facilities, and isolation centres, by the use of fogging equipment. With the objective of effective disinfection, we bring you the concept of fogging technique.

 For the same, an efficient fog generator has been designed by us for disinfection of any surface and inanimate objects. Our machine uses thermal fogging differently it

generates vapour of disinfectant liquid on passing with high pressure through a narrow heated copper pipe. This allows us to achieve our target of inhibition of the transmission of virus from inanimate objects to human beings.

Methodology:

The methodology of the proposed project is summarized in Fig. 1.

Following the flow diagram, first of all it is necessary to determine the best disinfectant chemical. Since our main goal is to disinfect our hands, there is no substitute for determining the right germ-killing chemical.

Disinfection by fogging efficiently terminates. Here we have chosen disinfectant 70% Isopropyl alcohol with water which will be converted as a fog.

As a disinfectant, Isopropyl Alcohol is the most often encountered and extensively employed in the pharmaceutical industry as well as hospitals, cleanrooms, and the manufacture of electronic or medical equipment.

And later in 2nd step, it is necessary to make the electronic circuit for the production of fog from the disinfectant liquid. We will make the fogger circuit that converts liquid into fog water vapour with Sonar sensor, ATmega328P, relay. We have used 113 KHz piezoelectric disc to create the fogger circuit.
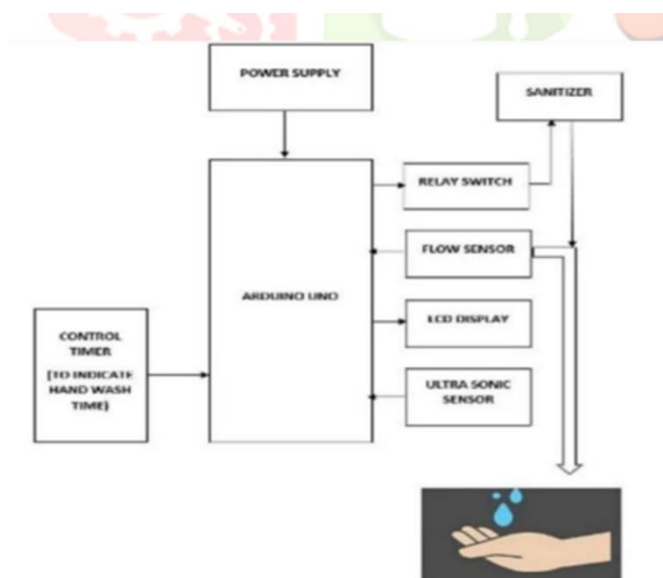

Fig 1 Block diagram

Using a fog-based mechanism, our technology advances to a new level to enable even greater water

savings. A tank is attached to the machine beneath it. If necessary, the tank is filled with water and any

safe herbal sanitizing liquid. A water fogging system is unintentionally activated when a user applies

soap to their hands and inserts them into the device, turning the water in the tank into fog and propelling

it into the handwashing chamber. Now that fog is in a vapour state, it may cover the entire hand in less

than 5 seconds (water vapour). The soap on a user's hand gets washed away with the fog five to fifteen

seconds after being exposed to water fog. This calls for little effort.

Results and 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 viral 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 wellbeing and also they are easily available and can be used by everyone without any hassle.

Scope for future:

The future scope for a dry hand washing machine using fog disinfectant using Arduino is quite promising. With the increasing concern for water conservation and the need for effective hand sanitization, especially in public places, this innovative technology has the potential to make a significant impact.

One potential area of growth is in the development of more advanced fog disinfectant systems that can be integrated with Arduino. This could include the creation of more efficient and effective fogging mechanisms, as well as the development of new disinfectant formulas that are safe for human skin and the environment.

Another area of scope is in the expansion of this technology to various industries, such as healthcare, hospitality, and education. Imagine having dry hand washing machines in hospitals, schools, and public restrooms, providing a convenient and water-efficient way to maintain hand hygiene.

Additionally, the use of Arduino in these machines opens up possibilities for IoT integration, allowing for real-time monitoring and data analysis of hand sanitization

patterns. This could lead to valuable insights on how to improve hand hygiene practices and reduce the spread of diseases.

Furthermore, the dry hand washing machine using fog disinfectant could also be designed to be portable and compact, making it ideal for use in remote or disaster-stricken areas where access to clean water is limited. Overall, the future scope for this technology is vast, and with continued innovation and development, it has the potential to make a significant impact on public health and water conservation. To improve the efficiency of the fog disinfectant system for dry hand washing machines using Arduino, several aspects can be optimized.

Innovation in the project:

The dry hand washing machine using fog disinfection with Arduino is innovative due to its fog-based disinfection system, which saves over 95% of water compared to traditional tap-based hand washing. This system uses a fog maker to convert water and a safe herbal disinfectant liquid into a fog, which is then driven into the handwash chamber. This allows for efficient and thorough disinfection of hands in less than 5 seconds. Additionally, the machine has a controller system that allows for manual settings such as the time for which the machine drives the fog for each user. This makes it special and more efficient compared to traditional hand washing methods, as it effectively washes hands while significantly saving water.