

DRY HANDWASH MACHINE USING FOG DISINFECTION

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Abstract—Since the start of COVID pandemic it is been suggested to wash your hands multiple number of times perday. But can we afford to waste such huge amount of water. The problems that would be created by wastage of water would create a greater problem than the pandemic itself. To help solve this system we here design a system that provides hand washing while consuming over 95 percentage less water. Our machine goes ahead another level to enable even more water saving using a fog based system. The machine is integrated with a tank below it. The tank is filled with water along with any safe herbal disinfectant liquid if required. When the user rubs soap on his/her hands and inserts it into the system, this automatically triggers a water fogging system.

Keywords—component, formatting, style, styling, insert

I. INTRODUCTION

The relevance of hand washing cannot be downplayed, particularly in improving countries where it is common practice to eat with hands. In some emerging societies, there is often a hesitation to wash hands before meals; and in some, hand washing has established a generally common practice. Wanting to eat with your hands has been continuing for decades before anyone suddenly learned of washing their hands. So, along the way, through technologies and hygiene measures, individuals are taught to improve hand washing.

Hand washing is the perhaps most effective way to avoid the transmission of diseases. Not washed or badly clean hands are very popular forms to transmit many infections such as fever, colds, diarrhoea, sore throat, and other hand-borne diseases. Hand Hygiene is one of the most effective strategies to mitigate the transmission of pathogens and avoid outbreaks, such as the virus COVID-19. Community members will provide a vital role in the battle against COVID-19 by implementing regular hand hygiene as a component of their daily activity. Promoting the practice of hand washing with soap and water is one of the simplest, low tech and most cost effective public health measures to prevent transmission of COVID 19 as well as many other communicable diseases. The COVID- 19 outbreak has given renewed attention to the failure of community preparation and its effect on urban health in emerging nations. Soap must be used in association with flowing water in hand washing is a primary method to avoid the transfer of COVID-19. In this health practice, it

will fight COVID-19 and will help individuals associated with health risks and those of the children. In fact, this is an important method of infection control or limiting the spread of this pandemic. Better soap-washing percentages on key public health instances have been shown to be very reliable. The availability of hand washing stations is perceived to be a simple personal hygiene activity with a positive externality in terms of public health benefits. Its access also depends on the availability of a secure supply of a sufficient quantity of water and reasonable rates.

From the study of Jan Baccay and his friends, they stated that multi-station automatic hand wash provides complete and hygienic hand washing activities with soap and water through its several stations that apparently and essentially operate independently of each other, satisfy the WHO hand washing duration standard and accommodate the WHO hand washing technique. 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 millimeter 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 tap only 10 – 30 percentage water actually touches our skin and rest just flows over this first layer of water.

A. Problem Specification

Since the onset of the COVID-19 pandemic, it is recommended that you wash your hands several times a day. But can you waste so much water? The problem of irrational water use will cause more problems than the epidemic itself. To solve this problem, we have developed a system that allows you to wash your hands without using more than 95 percentage water. Sometimes hand disinfection is a very important factor in the fight against infectious diseases. But do you need a lot of water to disinfect your hands? After all, many wash their hands (more than 15-20 seconds when turning the tap). To disinfect with disinfectant or soap, water is enough to reach every millimeter of your hand. This should be enough to kill the infection or get out of your hands. When the faucet is open, only 10-30 percentage of the water touches the skin and

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the rest flows through this first layer of water. Our machines go even further and save more water through the wrong base system. The engine is integrated with the tank at the bottom.

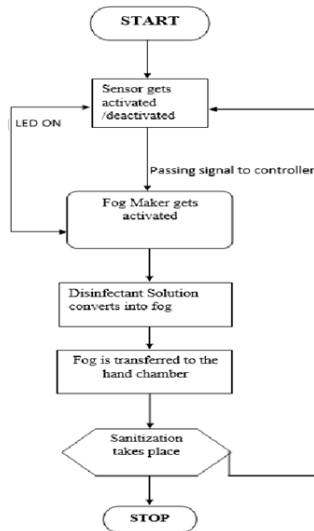
If necessary, the tank is filled with water with a safe herbal disinfectant.

When the user rubs his hands against the soap system, the water mist system activates automatically, converting the water in the reservoir into mist leading to the bathroom. Since it is in a gas (water vapor) state, it can be reached in less than 5 seconds.

After exposing the user to water mist for 5-15 seconds, wash off the soap from hands with water mist. Use less than 95 percentage of the water needed to wash your hands in a traditional mixer. The machine consists of a fan that moves the air needed to float the fertilizer in the toilet. This hand-held washing machine is equipped with a manual control system based on Atmega. This parameter includes the amount of time that the device must pass for each user. Thus, the machine we offer can be sterilized by hand washing while saving a lot of water.

B. Methodologies

When the user's hand is placed in the specified position on the machine, the sensor is activated and the water mist system is automatically activated, turning the water in the reservoir into a malfunction and directing it to the bathroom. When the liquid material evaporates at the end of the resonator and condenses on contact with cold ambient air, it forms ultrafine aerosols and creates a noticeable thick cloud of fog. Pure oil solutions or aqueous liquids with a glycol component are



especially suitable. The DC fan is used to mechanically drive and deliver the generated mist to the manual chamber.

Layout of the Project When the user's hand is placed in the specified position on the machine, the sensor is activated. • Water mist system is automatically activated.

- Different timer buttons are arranged with different time delays.
- By choosing the time delay buttons the mechanism will get activated.
- After choosing the time delay button both water pump and drier will get activated.
- Based on the time delay chosen the water along with the disinfectant will be sprinkled on hands.
- At the same time the drier will also get turned on.
- The sanitization takes place as the above steps.

II. LITERATURE SURVEY

The relevance of hand washing cannot be downplayed, particularly in improving countries where it is common practice to eat with hands. In some emerging societies, there is often a hesitation to wash hands before meals; and in some, hand washing has established a generally common practice. Wanting to eat with your hands has been continuing for decades before anyone suddenly learned of washing their hands. So, along the way, through technologies and hygiene measures, individuals are taught to improve hand washing. Hand washing is the perhaps most effective way to avoid the transmission of diseases. Not washed or badly clean hands are very popular forms to transmit many infections such as fever, colds, diarrheal, sore throat, and other hand-borne diseases. Hand Hygiene is one of the most effective strategies to mitigate the transmission of pathogens and avoid outbreaks, such as the virus COVID-19. Community members will provide a vital role in the battle against COVID-19 by implementing regular hand hygiene as a component of their daily activity. Promoting the practice of hand washing with soap and water is one of the simplest, low tech and most cost effective public health measures to prevent transmission of COVID 19 as well as many other communicable disease.

The COVID-19 outbreak has given renewed attention to the failure of community preparation and its effect on urban health in emerging nations [3]. Soap must be used in association with flowing water in hand washing is primary method to avoid the transfer of COVID-19. In this health practice, it will fight COVID-19 and will help individuals associated with health risks and those of the children. In fact, this is an important method of infection control or limiting the spread of this pandemic. Better soap-washing percentages on key public health instances have been shown to be very reliable.

operate independently of each other, satisfy the WHO hand washing duration standard and accommodate the WHO hand washing technique. Because of the COVID-19 pandemic, there are several hand washing technologies have evolved.

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A hand washing station was designed for infrastructure-restricted areas in Bangladesh were developed. Their projects included the integration of behavioural models for water, sanitation, and hygiene intervention. Automated hand washing that helps individuals not only with regular people but people with dementia using video and a process called observable Mark ovdecision was made by Hoey et al.

Another innovation was developed by Li et al. called Wrist-watch. This is wrist-worn detection interface that combines a Hidden Markov Model analysis tool and an inertial calculation unit that allows automatic evaluation of hand washing habits. Emotional intelligence was associated with an assistive hand washing system was also established in a thesis conducted by Lin [16]. Health workers' hand washing was also observed in hospitals to make sure that diseases will not be transmitted.

Hence, Naim et al. developed stain detection in automatic hand washing by applying an audit vision system. Automatic hand washing has many benefits, such as hygiene, lower costs, and minimal waste generation. Through all those reviewed documents, this paper conceptualized project that will automatically wash hands and be integrated with a hand dryer. The researchers came up with a design that will reduce the risk of transfer of disease, solve the challenges experience related to washing and drying of hands. This will also improve the level of hygiene of individuals and also the awareness of people that there are designs like this.

A. Existing systems:

In past days system was developed using complete hardware module, here if they are handling system bulky. So it is not possible to carry, But here the problem is solved using iot and android gadgets making system very simple.

B. Proposed Method:

When the user's hand is placed in the specified position on the machine, the sensor is activated and the water mist system is automatically activated, turning the water in the reservoir into a malfunction and directing it to the bathroom. When the liquid material evaporates at the end of the resonator and condenses on contact with cold ambient air, it forms ultrafine aerosols and creates a noticeable thick cloud of fog. Pure oil solutions or aqueous liquids with a glycol component are specially suitable. The DC fan is used to mechanically drive and deliver the generated mist to the manual chamber.

III. PROBLEM DEFINATION

Since the onset of the COVID-19 pandemic, it is recommended that you wash your hands several times a day. But can you waste so much water? The problem of irrational water use will cause more problems than the epidemic itself. To solve this problem, we have developed a system that allows you

to wash your hands without using more than 95 percentage water. Sometimes hand disinfection is a very important factor in the fight against infectious diseases. But do you need a lot of water to disinfect your hands? After all, many wash their hands (more than 15-20 seconds when turning the tap). To disinfect with disinfectant or soap, water is enough to reach every millimeter of your hand. This should be enough to kill the infection or get out of your hands. When the faucet is open, only 10-30 percentage of the water touches the skin and the rest flows through this first layer of water. Our machines go even further and save more water through the wrong base system. The engine is integrated with the tank at the bottom. If necessary, the tank is filled with water with a safe herbal disinfectant.

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IV. SYSTEM DESIGN

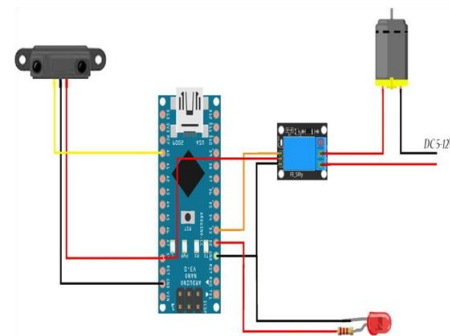


Fig. 2. Circuit Diagram

- Very small and nicelooking.
- It is designed to be manufactured using readily available componentsand software.
- Arduino is an open-source electronics platform based on easy-to-use hardware and software.
- The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users.

- Arduino is a key tool to learn new things.
- Effective Handwash
- Upto 95
- Easy To Use.
- Automatic Operation.
- Durable and relatively maintenance-free.

Basically, the processor of the Arduino board uses the Harvard architecture where the program code and program data have separate memory. It consists of two memories such as program memory and data memory. Wherein the data is stored in data memory and the code is stored in the flash program memory.

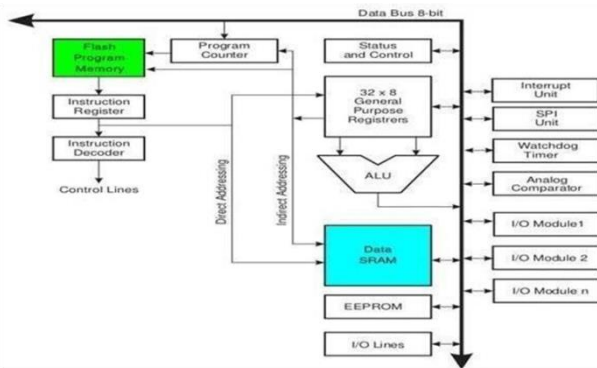


Fig. 3. Arduino Architecture

Now, let us see the details of the various building blocks of the hardware of an Arduino. The building blocks are:

- Power
- Pins -5V, 3.3V, GND, Analog, Digital
- Reset Button.
- Main IC
- Power LED Indicator
- TX RX LED's.

IMPLEMENTATION ISSUES IDE stands for Integrated Development Environment. Pretty fancy sounding, and should make you feel smart any time you use it. The IDE is a text editor-like program that allows you to write Arduino code. When you open the Arduino program, you are opening the IDE. It is intentionally streamlined to keep things as simple and straight forward as possible. When you save a file in Arduino, the file is called a sketch— a sketch is where you save the computer code you have written. The coding language that Arduino uses is very much like C++ (“seeplusplus”), which is a common language in the world of computing. The code you learn to write for Arduino will be very similar to the code you write in any other computer language – all the basic concepts remain the same – it is just a matter of learning a new dialect should you pursue other programming languages.

The code you write is “human readable”, that is, it will

make sense to you (sometimes), and will be organized for a human to follow. Part of the job of

the IDE is to take the human readable code and translate it into machine- readable code to be executed by the Arduino. This process is called compiling. The process of compiling is seamless to the user. All you have to do is press a button. If you have errors in your computer code, the compiler will display an error message at the bottom of the IDE and



Fig. 4. Arduino logo

highlight the line of code that seems to be the issue. The error message is meant to help you identify what you might have done wrong—sometimes the message is very explicit, like saying, “Hey – you forget a semicolon”, sometimes the error message is vague. Why be concerned with a semicolon you ask? A semicolon is part of the Arduino language syntax, the rules that govern how the code is written. It is like grammar in writing. Say for example we didn't use periods when we wrote – everyone would have a heck of a time trying to figure out when sentences started and ended. Or if we didn't employ the comma, how would we convey a dramatic pause to the reader. And let me tell you, if you ever had an English teacher with an overactive red pen, the compiler is ten times worse. In fact – your programs WILL NOT compile without perfect syntax. This might drive you crazy at first because it is very natural to forget syntax. As you gain experience programming you will learn to be assiduous about coding grammar.

V. HARDWARE IMPLEMENTATION

Node MCU-ESP8266:

Node MCU is a low-cost open source IoT platform. It initially included firmware which runs on the ESP8266 Wi-Fi SOC from Espressif Systems. ESP8266 is a micro controller with inbuilt Wi-Fi module and sends data to IoT device server.

The general features of this board are as follows:

- It is a user-friendly (easy to use) low cost Wi-Fi microchip.
- It works as access point (hotspot) or a station (Wi-Fi).
- Programmability with Arduino IDE.
- Micro controller: Tensilica 32-bit RISC CPU Xtensa

LX106

- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1
- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard,

Enabling Plug n Play

- PCB Antenna
 - Small Sized module to fit smartly inside your IoT projects
- Description:**

Node MCU is an open source platform based on ESP8266 which can connect objects and let data transfer using the Wi-Fi protocol. In addition, by providing some of the most important features of micro controllers such as GPIO, PWM, ADC, and etc, it can solve many of the project's needs alone. The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any micro controller access to your Wi-Fi network. The Node MCU ESP8266 development board comes with the ESP-12E module containing the ESP8266 chip having Tensilica Xtensa 32-bit LX106 RISC microprocessor. This microprocessor supports RTOS and operates at 80MHz to 160 MHz adjustable clock frequency. Node MCU has 128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with in-built Wi-Fi / Bluetooth and Deep Sleep Operating features make it ideal for IoT projects. Node MCU can be powered using a Micro USB jack and VIN pin (External Supply Pin). It supports UART, SPI, and I2C interface.

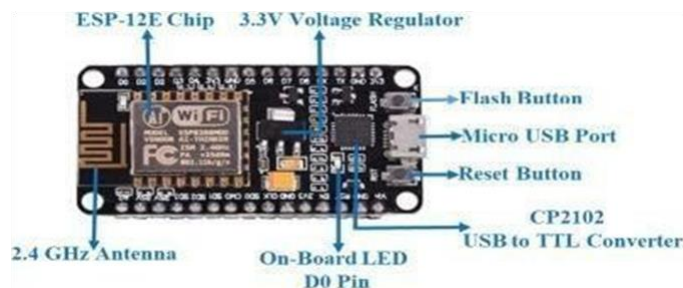


Fig. 5. ESP8266WI-FI module

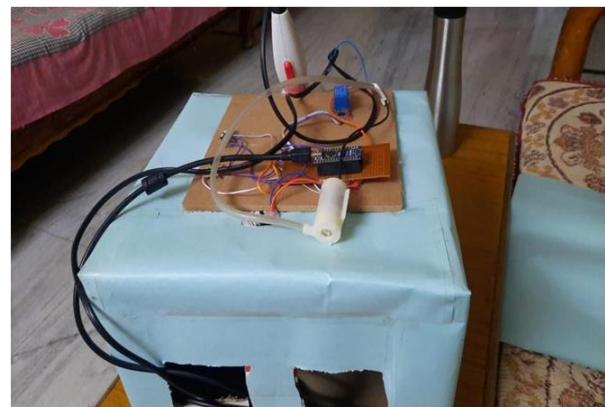
The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any micro controller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or

offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi ability as a Wi-Fi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth



co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts. What is an IR Sensor?



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IR technology is used in daily life and also in industries for different purposes. For example, TVs use an IR sensor to understand the signals which are transmitted from a remote control. The main benefits of IR sensors are low power usage, their simple design their convenient features. IR signals are not noticeable by the human eye. The IR radiation in the electromagnetic spectrum can be found in the regions of the visible microwave. Usually, the wavelengths of these waves range from 0.7 μm to 1000 μm . The IR spectrum can be divided into three regions like near-infrared, mid, and far-infrared. The near IR region's wavelength ranges from 0.75

– 3 μm , the mid-infrared region's wavelength ranges from 3 to 6 μm the far IR region's infrared radiation's wavelength is higher than 6 μm .

– What is an IR Sensor/Infrared Sensor?

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called a passive IR sensor. Usually, in the infrared spectrum, all the objects WHO and drying of hands. Future work may include solar-powered automated hand wash with noncontact temperature reader as most of the time, and there are power interruptions.

Limitations:

- Requires Maintenance.
- Requires Power Super.

A. *Future Scope:*

The proposed work has many important advantages and helps to kill viruses and bacteria in public places such as train stations, airports and theaters. Good hygiene is helpful as it is a non-contact approach that helps maintain proper social distancing in line with general standards. Its portable design makes it easy to install and use in a variety of locations depending on your needs. The technology used is still new and very unstable. Using about 95 percentage less water than traditional hand washing, it solves one of the biggest water saving problems, which is why we see progress and new products on the market with a similar mechanism. .. Use less than 95 percentage of the water needed to wash your hands using conventional faucets. The saved water can be used for other purposes. The system is fully automated and avoids manual mistakes such as opening the tap, tap leaks and maximizing water savings. With this mechanism, the

radiate some form of thermal radiation.

These types of radiations are invisible to our eyes, which can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode that is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.

VI. CONCLUSIONS AND FUTURE ENHANCEMENTS

Keeping hands clean is one of the most important to avoid getting sick and spreading germs to others, especially in this pandemic time since many diseases are spread by not washing hands with soap and clean water properly. The system requirement was based on the World Health Organization (WHO) protocol requires that hand washing should be done for duration of 20 seconds, and it will be dry. The use of non-contact automated hand wash with a hand dryer is one of the best strategies to eliminate or decrease the spread of corona virus. Tests show that all the requirements are met.

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