INTERNATIONAL JOURNAL OF TECHNO-ENGINEERING
IJTE

ISSN: 2057-5688

AUTOMATIC HAND SANITIZER DISPENSER USING ARDUINO WITH COVID-19 RULES

Basava Prasanna (178r1a0406), Chakilam Priyanka (178r1a0409) , Devanaboina Vamshi(178r1a0414), Donkena Alisha(178r1a0415)
Department of ECE, C M R Engineering college,Hyderabad, Telangana, INDIA,

Abstract- The COVID-19 pandemic has radically affected life for almost everyone around the globe, and makers are no exception. With everyone being more careful of their interactions with humans and objects, personal hygiene has taken serious precedence over all other factors in public space. A lot of public places have hand sanitizers for visitors, but they need to be manually pressed. To avoid any contact at all, some no-touch hand sanitizer dispensers are commercially available, but they are expensive and most off-the-shelf commercial sanitizers cannot be automated. In this project, we create a contactless hand sanitizer dispenser that can be used for any press-to-release hand sanitizer available in the market. The project uses an Arduino Uno, an HCSR04 Ultrasonic sensor, and a servo motor. The system is adjustable to accommodate most sanitizer bottles. We'll cover the basics of how these sensors work before detailing how to make one of these on your own! This device is an automatic hand wash dispenser which dispenses a specific amount of handwashing liquid on to your hands when placed under a distance measuring sensor (ultrasonic sensor). Here the ultrasonic sensor is used to detect the presence of hand placed under the device (20 cm from the sensor). A 12 V Peristaltic pump is employed to eject the right amount of liquid at the right time. i.e., when the hands are placed in the 20 cm range

Key words- Arduino Uno, Ultrasonic sensor, servo motor

I. INTRODUCTION

In this corona period hand sanitizer is an essential thing. Because it can kill the COVID -19 virus. but use the of normal sanitizer bottle become very danger. When an infected person presses the bottle trigger, the virus may spread from this hand sanitizer bottle. We can solve this by using Automatic hand sanitizer bottle. Automatic means, no need to trigger with our hand. Just place your hand near the bottle. the bottle will automatically trigger. Hand sanitizer is a liquid, gel or foam generally used to decrease infectious agents on the hands. In most settings hand washing with soap and water is generally preferred. Hand sanitizer is less effective at killing certain kinds of germs, such as norovirus and *Clostridium difficile* and unlike hand washing, it cannot physically remove harmful chemicals. People may incorrectly wipe off hand sanitizer before it has dried, and some are less effective because their alcohol concentrations are too low. In most healthcare settings, alcohol-based hand sanitizers are preferable to hand washing with soap and water, because it may be better tolerated and is more effective at reducing bacteria. Hand washing with soap and water, however, should be carried out if contamination can be seen, or following the use of the toilet. The general use of non-

ISSN: 2057-5688

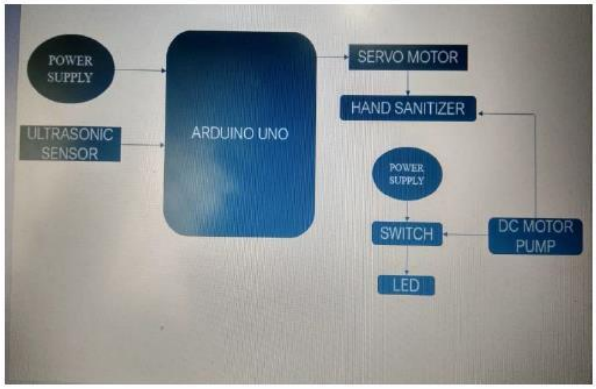
alcohol-based hand sanitizers has no recommendations.Alcohol-based versions typically contain some combination ofisopropyl alcohol, ethanol (ethyl alcohol), or *n-propanol*, withversions containing 60% to 95% alcohol the most effective.Care should be taken as they are flammable. Alcohol-basedhand sanitizer works against a wide variety of microorganismsbut not spores. Compounds such as glycerol may be added toprevent drying of the skin. Some versions contain fragrances;however, these are discouraged due to the risk of allergicreactions. Non-alcohol based versions typically containbenzalkonium chloride or triclosan; but are less effective thanalcohol-based ones. Alcohol has been used as an antisepticat least as early as 1363 with evidence to support its usebecoming available in the late 1800s. Alcohol-based handsanitizer has been commonly used in Europe since at leastthe 1980s. The alcohol-based version is on the World Health Organization's List of Essential Medicines, thesafest and most effective medicines needed in a healthsystem. Hand sanitizer that contains at least 60% alcoholor contains a "persistent antiseptic" should be used.Alcohol rubs kill many different kinds of bacteria,including antibiotic resistant bacteria and TB bacteria.They also kill many kinds of viruses, including the fluvirus, the common cold virus, coronaviruses, and HIV. In too low quantities (0.3 ml) or concentrations (below60%) the alcohol in hand sanitizers may not have the 10–15 seconds exposure time required to denature proteinsand lyse cells. In environments with high lipids or proteinwaste (such as food processing), the use of alcohol handrubs alone may not be sufficient to ensure proper handhygiene .
In the beginnings of the pandemic, because ofhand sanitizer shortages due to panic buying, peopleresort of using 60% to 99% concentrations of isopropyl orethyl alcohol for hand sanitization, typically mixing themwith glycerol or soothing moisturizers or liquid containaloe vera to counteract irritations with options of adding drops of lemon or lime juice or essential oils for scents,and thus making..
The hand sanitizer is an exceptional bit of late innovation during 19th century. Alcohol based hand sanitizers 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, it is exhorted by WHO (world health organization) to keep up

INTERNATIONAL JOURNAL OF TECHNO-ENGINEERING
IJTE
ISSN: 2057-5688

the healthy sanitizing habits, yet the fundamental issue is that the manner in which we do it, that is by the physical touch to the container which doesn't fulfil the purpose

II. WORKING MODEL AND COMPONENTS

Here, we use an Ultrasonic distance sensor, Servo motor and Arduino board. here I am using Arduino Uno. You can also use any other microcontroller. When we place our hand in front of the distance sensor, it will help to the Arduino to measure the distance from the sensor to object (here the hand). if the object in the desired range, Arduino will write the servo to 180. Servo motor is mounded on the hand sanitizer bottle. And the trigger of bottle is connected to servo by a thread. When servo motor rotates, the trigger will press.



(a) Fig.

1 Automatic Sanitizer block diagram

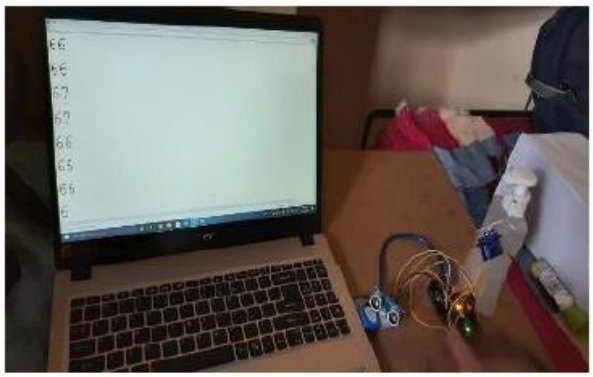


Fig. 2 Working model of Sanitizer

INTRODUCTION TO ARDUINO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analogue inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip.

INTERNATIONAL JOURNAL OF TECHNO-ENGINEERING
IJTE
ISSN: 2057-5688

Instead, it features the Atmega16U2 (Atmega8U2 up toversion R2) programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark theupcoming release of Arduino 1.0. The Uno and version
1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduinoboards, and the reference model for the Arduino platform;for a comparison with previous versions
Arduino UNO board is the most popular board in the Arduino board family. In addition, it is the best board to get started with electronics and coding. Some boards looka bit different from the one given below, but most Arduinos have majority of these components in common.

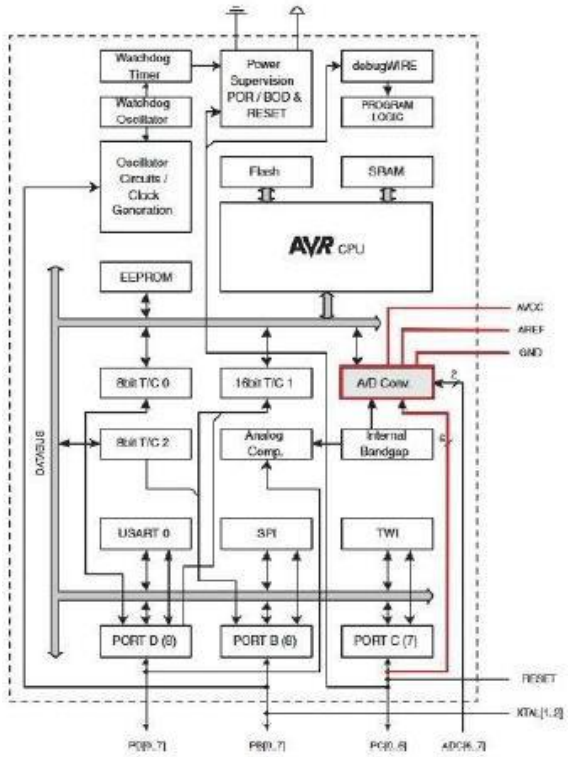


Fig:3 Arduino Block Diagram

A servo motor is a self-contained electrical device, that rotate parts of a machine with high efficiency and with great precision. The output shaft of this motor can be moved to a particular angle, position and velocity that a regular motor does not have. The servo motor is a closed- loop mechanism that incorporates positional feedback in order to control the rotational or linear speed and position. The motor is controlled with an electric signal, either analog or digital, which determines the amount of movement which represents the final command position for the shaft. A type of encoder serves as a sensor providing speed and position feedback. This circuitry is built right inside the motor housing which usually is fittedwith gear system.

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans Ultrasonic

ISSN: 2057-5688

sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).

In order to calculate the distance between the sensor and the object, the sensor measures the time it takes between the emission of the sound by the transmitter to its contact with the receiver. The formula for this calculation is **D = ½ T x C** (where D is the distance, T is the time, and C is the speed of sound ~ 343 meters/second). For example, if a scientist set up an ultrasonic sensor aimed at a box and it took 0.025 seconds for the sound to bounce back, the distance between the ultrasonic sensor and the box would be: Ultrasonic sensors are used primarily as **proximity sensors**. They can be found in automobile self-parking technology and anti-collision safety systems. Ultrasonic sensors are also used in robotic obstacle detection systems, as well as manufacturing technology. **In comparison to infrared (IR) sensors** in proximity sensing applications, ultrasonic sensors are not as susceptible to interference of smoke, gas, and other airborne particles (though the physical components are still affected by variables such as heat). Ultrasonic sensors are also used as **level sensors** to detect, monitor, and regulate liquid levels in closed containers (such as vats in chemical factories). Most notably, ultrasonic technology has enabled the medical industry to produce images of internal organs, identify tumours, and ensure the health of babies in the womb.

A direct current (DC) motor is a type of electric machine that converts electrical energy into mechanical energy. DC motors take electrical power through direct current, and convert this energy into mechanical rotation. DC motors use magnetic fields that occur from the electrical currents generated, which powers the movement of a rotor fixed within the output shaft. The output torque and speed depend upon both the electrical input and the design of the motor. The term 'DC motor' is used to refer to any rotary electrical machine that converts direct current electrical energy into mechanical energy. DC motors can vary in size and power from small motors in toys and appliances to large mechanisms that power vehicles, pull elevators and hoists, and drive steel rolling mills. But how do DC motors work? DC motors include two key components: a **stator** and an **armature**. The stator is the stationary part of a motor, while the armature rotates. In a DC motor, the stator provides a rotating magnetic field that drives the armature to rotate. A simple DC motor uses a stationary set of magnets in the stator, and a coil of wire with a current running through it to generate an electromagnetic field aligned with the centre of the coil. One or more windings of insulated wire are wrapped around the core of the motor to concentrate the magnetic field.

The windings of insulated wire are connected to a commutator (a rotary electrical switch), that applies an electrical current to the windings. The commutator allows each armature coil to be energised in turn, creating a steady rotating force (known as torque).

INTERNATIONAL JOURNAL OF TECHNO-ENGINEERING
IJTE
ISSN: 2057-5688

When the coils are turned on and off in sequence, a rotating magnetic field is created that interacts with the differing fields of the stationary magnets in the stator to create torque, which causes it to rotate. These key operating principles of DC motors allow them to convert the electrical energy from direct current into mechanical energy through the rotating movement, which can then beused for the propulsion of objects.

Types of DC Motors

Fig:4 DC PUMP MOTOR

So far, this guide has broadly explained how DC motors work, the history of these mechanisms, and what they look like. While the principles are the same across variants, there are actually several different types of DC motors, which offer specific advantages and disadvantages over each other. This section of the guide will look at the four main types of DC motor - brushless, brushed, shunt, and series. Brushless DC motors are also known as electronically commutated motors, or synchronous DC motors, and differ to the brushed motor, thanks to the development of solid-state electronics.

The key differences between brushless DC motors and other varieties is that they do not have a commutator, which is replaced by an electronic servomechanism that is able to detect and adjust the angle of the rotor.

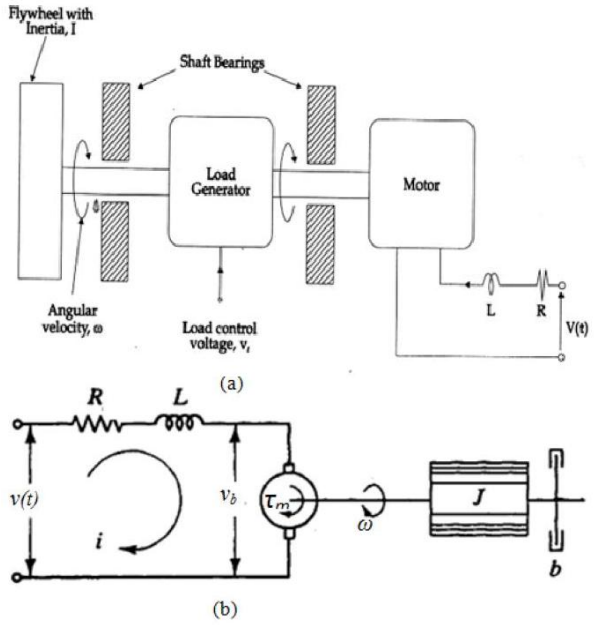
The **brushless DC motor** has several advantages. Commutators use soft contacts called ‘brushes’ which wear down over time. A brushless DC motor is therefore more durable, and also safer than the more classicaldesign.

All electric motors develop torque by alternating the polarity of rotating magnets attached to the rotor and stationary magnets on the surrounding stator. At least one of these set of magnets is an electromagnet, made from acoil of wire around an iron core. In a DC motor, DC running through the wire winding creates the magnetic field. Each time the armature rotates by 180°, the positionof the north and south poles are reversed. If the magnetic field of the poles remained the same, the rotor would notturn. To create torque in one direction in a DC motor, thedirection of the electric current must be reversed with every 180° turn of the armature.

In a traditional brushed motor, this would be done by a commutator, but in a brushless DC motor, an electronic sensor instead detects the angle of the rotor, with controlled semiconductor switches either reversing the

INTERNATIONAL JOURNAL OF TECHNO-ENGINEERING
IJTE
ISSN: 2057-5688

direction of the current or turning it off at the correct time in the rotation to create torque in one direction.



RESULTS

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

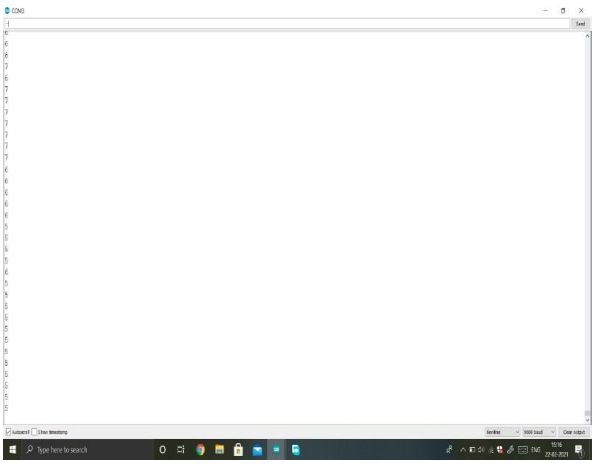


FIG:5 OUTPUT IDE SCREEN

ADVANTAGES

Our world has changed so much in 2020. The coronavirus has taught us many different things. It feels like yesterday when we were at the office shaking hands, talking freely, and roaming around at will. And now, we are locked

INTERNATIONAL JOURNAL OF TECHNO-ENGINEERING
IJTE
ISSN: 2057-5688

down in our homes, keeping a safe distance from others and using hand sanitizers after every few minutes.

Even as time passes and the '**new normal**' becomes a way of life for everyone, these new habits and newly gained consciousness about health and hygiene will stay. Of these, hand sanitization at regular intervals has found universal acceptance, pandemic or not. Further awareness campaigns on sanitization are on their way, and governments are installing hand sanitizers at numerous public spaces. To avoid contact, many people are opting for **touchless automatic hand sanitizer dispensers** as they are believed to offer an extra layer of protection.

An automatic hand sanitizer dispenser is an excellent alternative to the traditional ones as it requires zero to no contact. But with its so many advantages, there is still some scepticism regarding its usage and effectiveness.

1. Automatic

The first and foremost advantage of an **automatic sanitizer dispenser** is that it provides a truly touchless experience. There is no hassle of pressing a button or a handle (as in the case of foot-operated ones). These dispensers have ultrasonic sensors that release the sanitizer once you keep your hands below the nozzle. It'sfast, safe, and simply more efficient. lvi

2. Easy to use

For every appliance, the ease of use is what determines its feasibility. While choosing a sanitizer dispenser, you will want something that will be easy to use, unlike the manual ones.

Automatic hand sanitizer dispensers are better than the traditional ones as they dispense the sanitizer automatically. You don't have to apply physical pressure on the dispenser; just place your hands under the nozzle, and it provides the right amount.

3. Delivers a standard dose

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

4. Eliminates a contact point

Manual hand sanitizers require pushing the pump to release sanitizer. Touching the pump can spread a lot of germs, as people with dirty hands also use it.

With **touchless hand sanitizer dispensers**, there is no common contact point, which means less or no germs willbe transferred from one person to another.

5. Modern appearance

Contactless hand sanitizer dispensers usually have a sleekand stylish design. They also add a modern appeal to places they are installed in. If you install a contactless hand sanitizer dispenser at your workplace, then you are indeed giving a high-end vibe to your environment.

APPLICATIONS

Washing our hands before and after we eat something is extremely important from a personal hygienic point of view. Instead of using a soap that people use with dirty

ISSN: 2057-5688

hands, people now use a hand sanitizer dispenser. Our initial point of contact with germs is often from the hands. Unfortunately, not many people wash or maintain basic hygiene of their hands. Over the time people have started emphasising more and more on maintaining personal cleanliness and hygiene. And the best way to keep viruses and bacteria at bay is, of course, by frequent hand washing. Using a sanitizer dispenser for this reduces your chances of getting sick in your inevitable daily interactions with people and germs. Hand sanitizer dispenser also is handy in water-scarce areas.

CONCLUSION

This is a one-day build that you can try at home and works equally well in any commercial setting, but it also has obvious real-world implications for people looking to combine their passion for Maker work with more at-home sanitization during a pandemic! If you adjust the height of the servo mounting appropriately, any off-the-shelf sanitizer bottle can be put into use. While this project runs on a battery right now, ideally using a 6 V/1 A AC-DC power source is the most sustainable and cost-effective solution.

FUTURE SCOPE

The global Hand Sanitizer and Hand wash Market is comprehensively and accurately presented in the report with strong focus on dynamics, competitive scenarios, production, sales, revenue, consumption, geographical expansion, top key players, and other critical.
aspects. Each leading trend of the global Hand Sanitizer and Hand wash market is carefully studied and elaborately presented in the report. This will help players to take advantage of opportunities available in the global Hand Sanitizer and Hand wash market and tap into new or unexplored ones in the near future. Readers are also provided with detailed information on key drivers and restraints of the global Hand Sanitizer and Hand wash market. Players can become informed about unknown future challenges in the global Hand Sanitizer and Hand wash market and prepare effective strategies to better deal with

REFERENCES

1. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. Lancet. 2020;395(10223):470–3. [PMC free article] [PubMed] [Google Scholar]
2. Wu F, Zhao S, Yu B, Chen YM, Wang W, Song ZG, et al. A new coronavirus associated with human respiratory disease in China. Nature. 2020;579(7798):265–9. [PMC free article] [PubMed] [Google Scholar]
3. Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges. Int J Antimicrob Agents. 2020;55(3):105924. [PMC free article] [PubMed] [Google Scholar]
4. Spears L, inventor. Decorative Liquid Soap Container (DLSC) 12/291,938. United States patent application. 2010 Mar 25;

ISSN: 2057-5688

5. Bloomfield SF, Aiello AE, Cookson B, O'Boyle C, Larson EL. The effectiveness of hand hygiene proceduresin reducing the risks of infections in home and communitysettings including handwashing and alcohol-based hand sanitizers. Am J Infect Control. 2007;35(10):S27–S64. [Google Scholar]
6. Cittadino AM, Byl CC, Wilcox MT, Paal AP, Budz GD, Cornell RW, inventors. Pumping dispenser. 8,261 950. United States patent US. 2012 Sep 11;
7. Iseri M, Malina Y, Hardman J, inventors. Dispenser forhand sanitizer. 9,060, 655. United States patent US. 2015Jun 23;
8. Ministry of Food and Drug Safety. Introduction of non- medical products [Internet] Sejong, Korea: Ministry of Food and Drug Safety; c2020. [cited at 2020 Aug 4]. Available from: https://www.mfds.go.kr/wpge/m_637/de0508011001.do. [Google Scholar]
9. Arduino [Internet] Somerville (MA): Arduino; c2020. [cited at 2020 Aug 4]. Available from: https://www.arduino.cc/ [Google Scholar]