M. V. P. Samaj's

Arts, Science & Commerce College, Uttam Nagar CIDCO, Nashik-08 SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

B. Voc EAMR

Electrical Appliances Maintenance and Repairing

Project Report

On

Automatic hand sanitizer Dispenser

Submitted by-

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Department of B.Voc EAMR

Academic year

2021-2022

M. V. P.Samaj's

Arts,science &CommerceCollageUttamNagar CidcoNashik

Affiliated TO SAVITRIBAI PHULE UNIVERCITY, PUNE

CERTIFICATE

Certificated that the project Report entitled

"automatic hand sanitizer Dispenser"

Has, been successfully completed by:

Ubale Swapnil Muktaji

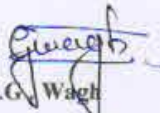More Anjana Sahebrao

As partial fulfilment of Degree cource in B.voc EAMR under Maharastra state board of Technical Education, pune during the acadmic year 2021-2022. The said work has been assessed by us and we are satisfied that the same is up to the standard envisaged for the level of the cource . And that the said work may be presented to the external examiner.

Smt. J. G Wagh

GUIDE

28/07/2022

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PRINCIPLE

2

DECLARATION

I' am hereby declare that this report is record authentic work carried out by us during the with semester and has not been submitted to any other university or institute.

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To the best of my knowledge, He bears a good moral character. His Date of Birth as per the Register is 10-September-1999.

Place :Nashik, Nashik
Date :14-Jul-2022

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Water is more precious than Gold

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Water is more precious than

CERTIFICATE OF BOSCH TRAINING

BOSCH Skills India

This is to certify that

Swapnil Muktaji Ubale

has successfully completed training on "Advance Residential Wiring"
from 14-02-2022 to 25-02-2022 conducted at Artisan Training Center, Nashik.

Issued
Mar. - 2022

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Issued
Mar. - 2022

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BOSCH
Invented for life

Topics

Automatic Hand Sanitizer Dispenser

INDEX

1. ABSTRACT

Corona virus is wreaking havoc in the world in the world Most of the country in the world is suffering from the corona virus WHO has already declared it as a pandemic disease and many cities are in lockdown situation of the global outbreak it is instructed by WHO (world health organization) to maintain healthy hand wash and sanitation habits , but the key problem is the way we do it , this is by physical touch . touching hand sanitizers with infected hands can the virus to the next person . in this content , we will build an automatic hand sanitizer dispenser that uses IR sensors to detect the presence of a hand and activates a pump to pour the liquid on thee hand .

You can find various Ardunio automatic liquid dispensers circulating the web but our motive is to keep it simple and cheap so that anyone can replicate it . possibly the easiest solution for this purpose is to use a simple transistor with any IR proximity sensor , which would also drastically reduce the costs . obviously , the absence of a microcontroller removes control over spilling , but using a smaller nozzle would physically maintain the flow of liquid .

FLOW CHART

DC PUMP
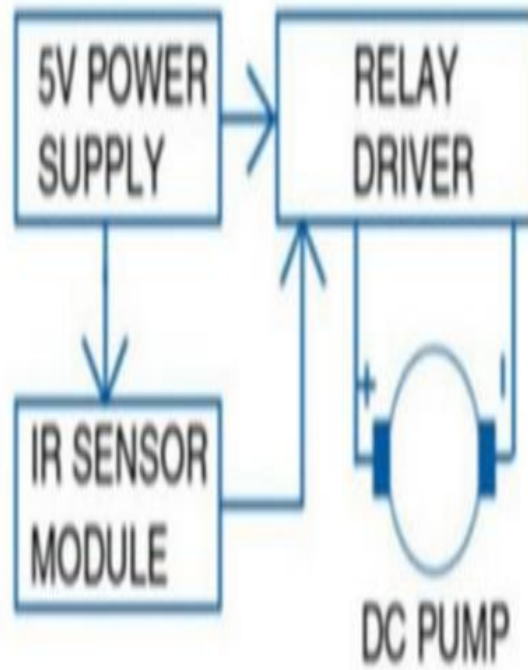
2 INTRODUCTION

The demand for hand sanitizers has surged as the corona virus broke out and spread around the world the gel hand sanitizer are generally used by squirting the sanitizer liquid when one presses a pump with one's hand it causes many people to come into contact with the pump handle , which raises the risk of viral transmission. Pressing the pump handle is boring and many pass by without disinfecting their hands .moreover every person presses the pump handle separately making it difficult to predict the amount of use and to manage refills and replacements for this reason the actual use of hand sanitizer is attenuate, which not helping to prevent the spread of the virus .

Many hand sanitizers on market are automatically pumped because sanitizer containers and pump devices are designed to be suitable only between products produced by the same manufacture , consumers most also repurchase the container for the liquid if they replace the hand sanitizer it is not economical and it has a negative influence on the environment by increasing waste emissions . moreover , some users think that it is a hassle to buy a hand sanitizer – containers device compatible again so they pour other hand sanitizers into previously used containers and reuse them . however ,sanitizer that come directly into contact with the human body are classified as medicines or non-medical   products and they are safest to use in actual containers .

3 WORKING PRINCIPLE

❖ My project is working for auto hand sanitizing and also work for indicating water level .

WORKING OF HAND SANITIZIR

The schematic is simple and easy to understand used an IR sensor relay module circulating pump for the circuit when the IR sensor faced with any object then it gives output to the relay module energized and trip the coil and close the circuit . So ready to start the motor for circulating water or sanitizer

WORKING OF WATER LEVEL INDICTOR

The connection and the arrangement are formed as shown in the figure below .the 9v supplied to water using a metal contact in this configuration , all the transistors are working as a switch when the water touches the metal contact in which the base of the transistors is connected a small current flows and turns on the transistor . when a transistor turns on the LED connect with it glows .

In this way LEDs will be turned on depending upon the level of water .

4   CIRCUIT DIAGRAM
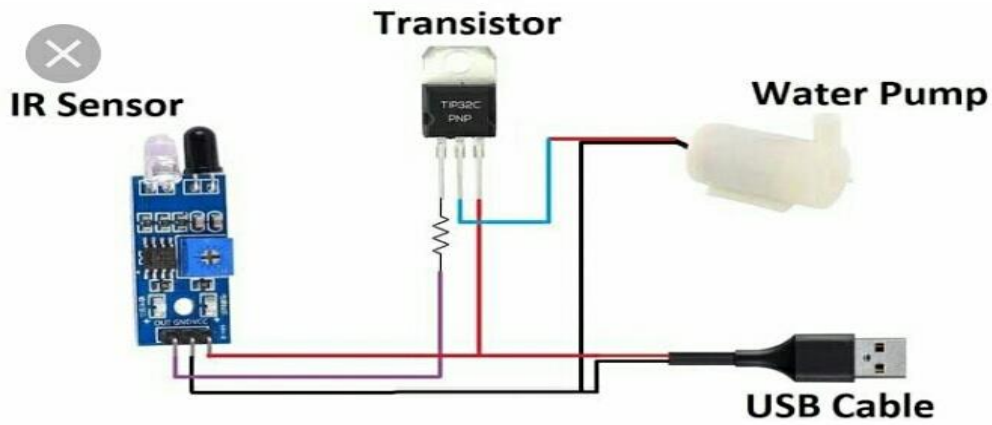
DIAGRAM OF HAND SANITIZIR
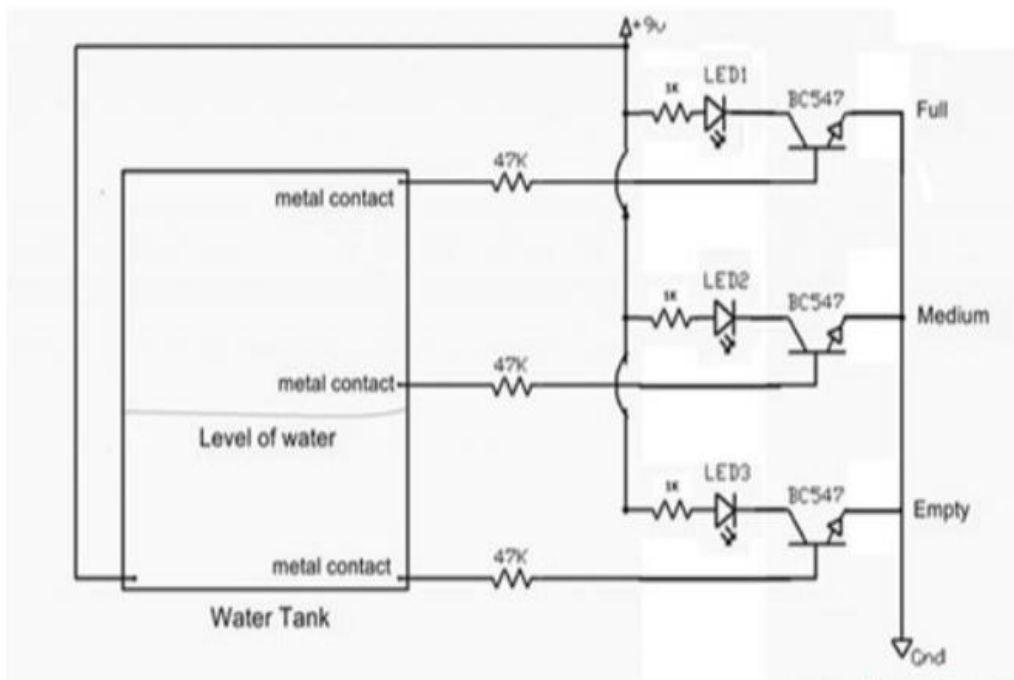
5 OBJECTIVES

Hand sanitizer are generally applied by squirting the sanitizer liquid one when one presses a pump with one' s hand it causes many people to come into contact with the pump handle , which increases the risk of viral transmission for this we need automatic hand sanitizer by using an IR sensor it is very simple construction and cost – effective it is very much familiar to people

6 COMPONENTS

- IR sensor
- DC – Water pump
- Pipe
- Transistor
- Resistor
- Glue gun

.

1   IR SENSOR

INTRODUCTION

An infrared   sensor emits for sensor some aspects of the surrounding an infrared sensor can measure the heat of an object and detects its   motion these types of sensor measure   only infrared radiation , rather than emitting it which is called a passive IR sensor generally infrared spectrum   all the objects radiate some form of thermal radiation .

These types of radiation are not our eyes which can be detected by an infrared sensor the   emitter is simply an IR LED (light emitting Diode) and the detector is simple an IR photodiode that is sensitive to infrared light of some wavelength as that emitted by the IR LED when infrared light falls on the photo diode , the resistance and the output voltages will change in proportion to the magnitude of the ir light received .
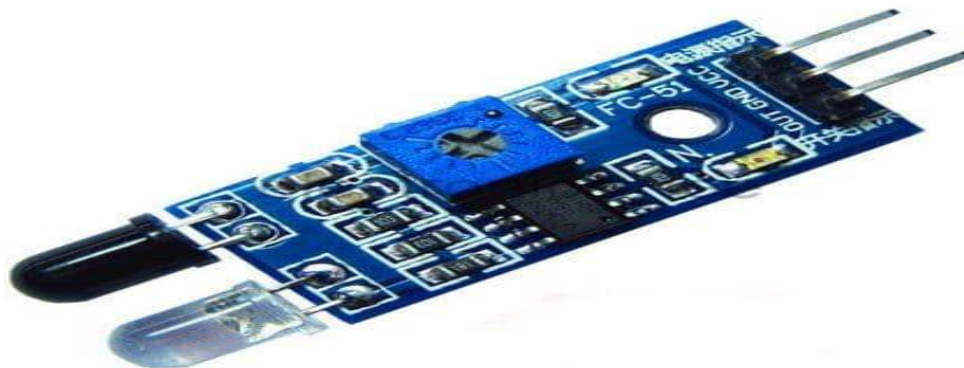
1.1   WORKING PRINCIPLE

The working principle of an infrared sensor is the same as the object detector sensor this sensor includes an infrared LED @ an IR photodiode , so combing these two can be formed as a photo- coupler otherwise opt coupler . the physics used in this laws used in this infrared sensor are planks radiation , Stephan Boltzmann & Weins displacement .

IR LED one kind of transmitter that emits IR radiation . this LED looks the same as a standard LED and the radiation which is generated by this not visible to the human eye . infrared receivers detect the radiation using an infrared transmitter . these infrared receivers are available in photodiode from IR photodiodes are dissimilar as compared with normal photodiodes because they detect mainly exist depending on the voltage , wavelength , package , etc .

Once it used as the combination of infrared LED the resistance of transmitter & receiver then the receiver wavelength must equal the transmitter here , the transmitter is an infrared LED whereas the receiver is an infrared photodiode is reactionary to the infrared light that is generated through an infrared LED the resistance of photo diode & the change in output voltage is in ratio to the infrared light obtained . this is the IR sensor fundamental working principle .

IR Sensor circuit diagram

An infrared sensor circuit is the primary and popular sensor module in an electronic device . this sensor is similar to human's visionary sensors ., which can be used to detect obstacles

and it is one of the common applications in real time this circuit comprise the following components .

1 LM358IC 2IR transmitter and receiver pair

2 resistors of the range of kilo-ohms.

3 variable resistors

4 LED (light Emitting Diode) .

In this project, the transmitter sections has an infrared sensor , transmits continuous infrared rays to be receiver module the out put terminal of the infrared of the receiver virus depending on its receiving of infrared rays . whereas this variation cannot be analyzed as such . there fore this output can be fed to a comparator circuit . an operational amplifier (op-amp) LM 399 is used as a comparator .

The potential at the inverting input goes higher than that non – inverting input of the comparator IC (LM339) when the infrared receiver does not receive does not receive a signal . the LED dose not glow when the output of the comparator goes low but . The potential at the inverting input goes low when the

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Resistor R1 (100), R2 (10k), and R3 (330) are used to confirm that a minimum of 10 m A current passes through the IR LED Devices like Photodiode and normal LEDs respectively. To adjust the output terminals resistor VR2 (preset=5k) is used. To set the sensitivity of the circuit diagram resistor VR1 (preset=10k) is used. Read more about IR sensors**.**

1.2   CIRCUIT WORKING

When the infrared LED is detected, then the reflected light from the thing activates a small current that will supply throughout the IR LED detector. This will activate the NPN transistor & the PNP; then the LED will switch ON. This circuit is applicable for making several projects like automatic lamps to activate once a person approaches close to the light

.Advantages

- The advantages of IR sensor include the following It uses less power

- Motion detection is possible in the presence or absence of light approximately with equal reliability.

- They do not need a connection with the object for detection

- There is no data leakage

- These sensors are not affected by corrosion & oxidation Noise immunity is very stron

- Lin The disadvantages of IR sensor include the following

- e of sight is required

- Range is limited

- These can be affected by fog , rain , dust ,etc

- Less data transmission rate

1.3   IR Sensor Applications

Depending on the applications IR sensors are classified into different types. Some applications of different types of sensors. The speed detection sensor is used for synchronizing the speed of multiple motors. The temperature measuring sensor is used for industrial temperature control. PIR motion sensor is used for an automatic door opening system and the Ultrasonic sensor is used for distance measurement.

IR sensors are used in various Sensor based projects and also in various electronic devices which measure the temperatur

2 .DCWATER PUMP

INTRODUCTION

Micro DC 3 to 6V Micro Submersible Pump Mini water pump For Garden Mini water circulation System DIY project. This is a low-cost and small-size Submersible Pump that can be operated from a 3 to 6V power supply. It can take up to 120 liters/hour with a very low current consumption of 220mA. Just connect the pipe to the motor outlet, submerge it in water, and power it. Confirm every time that the water level is higher than the motor. A dry run can damage the motor due to heating and it will also produce noise.

A branded automatic water dispenser is usually expensive. So, a relatively low-cost do-it yourself solution is presented here. It is a portable general-purpose automatic water dispenser perfectly suitable for homes to wash hands or feed water to pets. The presented system also offers many possibilities for extensions.

Specifications

- Operating Voltage : 3 ~ 6V
- Operating Current : 130 ~ 220mA
- Flow Rate : 80 ~ 120 L/H
- Maximum Lift : 40 ~ 110 mm
- Continuous Working Life: 500 hours
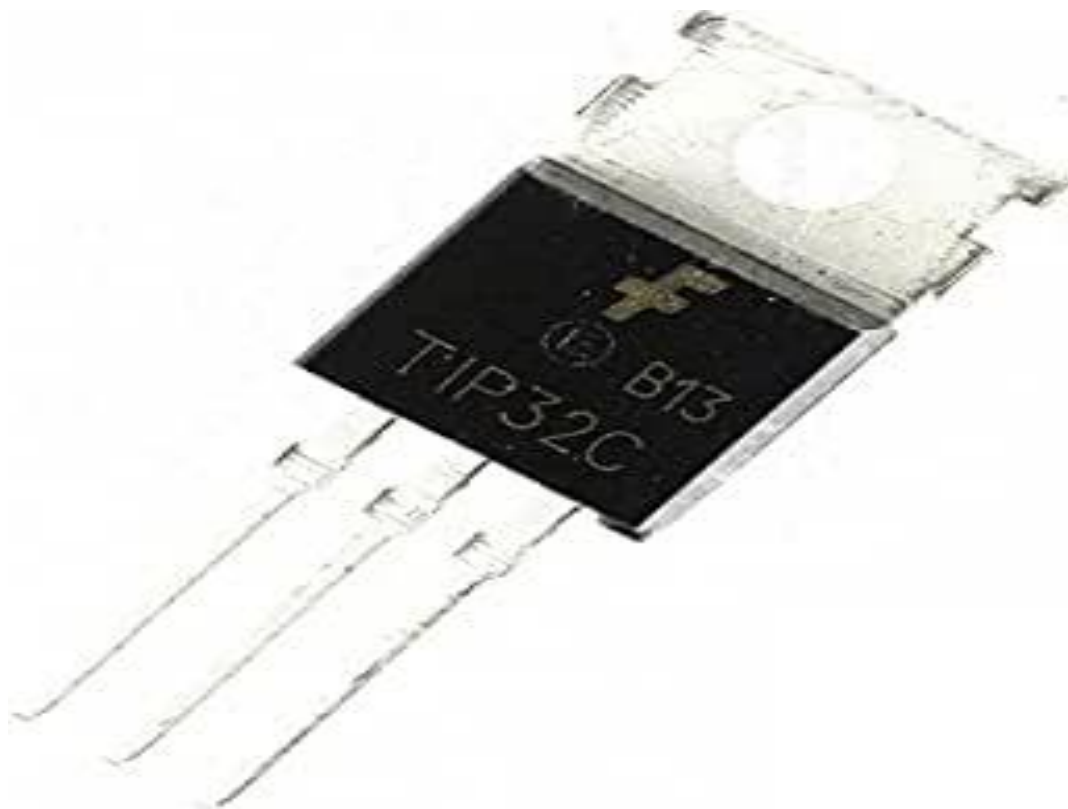- Driving Mode: DC, Magnetic Driving

3 PIPE

In our project, I used a normal water pipe. The pipe connects to the Motor. Circulating liquid sanitizer to the output through the pipe by the pressure of the pump

4 TRANSISTOR

1. Pin1 (Collector): This pin is denoted with the symbol 'C' and the flow of current will be through the collector terminal.
2. Pin2 (Base): This pin controls the transistor biasing.
3. Pin3 (Emitter): The current supplies out through emitter t
4. A Transistor works as an amplifier while functions in the active region to amplify voltage, current, and power at different configurations. The amplifier circuit uses three configurations which are the following.
5. Common emitter (CE) amplifier
6. Common collector (CC) amplifier

7. Common base (CB) amplifier

1.1   Applications

1 This BC547 <u>transistor</u> is used in general-purpose, widely used and it is used as an alternative and a substitute to different kinds of transistors. Thus, it can use in different electronic circuits

2 The absolute transition frequency of BC547 is 300MHz so that it will perform well within RF circuits.

3 Amplification of current

4 Audio Amplifiers

5 Switching Loads < 100mA

6 Transistor Darlington Pairs

7 Drivers like a LED driver, Relay Driver, etc.

8 Amplifiers like Audio, signal, etc.

9 Darlington pair

10 Quick switching

11 PWM (Pulse Width Modulation)

5 RESISTOR

A **resistor** is a passive electrical element that implements electrical resistance as a circuit element. In electronic circuits, resistors are used for reducing current flow, adjust signal levels, divide voltages, bias active elements, and terminate transmission lines, etc. High-power resistors can dissipate many watts of power as heat, may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistances that only change a little with temperature, time, or operating voltage. Variable resistors are used to adjust circuit elements (such as volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity.

Resistors are normal elements of electrical networks and electronic circuits and are universal in electronic equipment. Practical resistors

as discrete <u>components</u> can be composed of different compounds and forms. Resistors are also implemented into integrated circuits.

The function of a resistor is specified by its resistance: common resistors are manufactured over a range of more than nine orders of magnitude. The nominal value of the resistance falls within the producing tolerance, indica Cardboard

Cardboard is a generic term for heavy-duty paper-based products having a large thickness and superior stability or other specific mechanical attributes to paper; such as for ldability, rigidity, and impact resistance. The construction can range from a thick sheet-like paperboard to corrugated fiberboard which is made of many corrugated and flat layers.

Despite widespread common use in English and French, the term cardboard is dissipation in commerce and industry as not adequately defining a specific product. Material producers, container manufacturers, packaging engineers, and standards organizations, use more specific nomenclature

ted on the compone

6 GLUE GUN

Glue Gun

The gun uses a continuous-duty heating component to melt the plastic glue, which the user pushes through the gun either with a mechanical trigger mechanism on the gun or with direct finger pressure. … The glue is tacky when hot, and solidifies in a few seconds to one minute For commercial or businesses, household, hobby, and craft applications, inexpensive glue guns, and glue sticks are used for parts assembly, repairs, and bonding different materials. Variable heat glue guns enable proper control of viscosity and set times.

1.1   AUTOMATIC HAND DISPENSER

A branded automatic water dispenser is usually expensive. So, a relatively low-cost do-it yourself solution is presented here. It is a portable general-purpose automatic water dispenser perfectly suitable for homes to wash hands or feed water to pets. The presented system also offers many possibilities for extensions.

The system consists of three key segments: infrared (IR) proximity sensor, water pump driver, and mini submersible water pump. Also, there is a power supply block that holds a couple of standard dry cells.

1.2   IR PROXIMITY SENSOR

The use an IR proximity sensor is a practical way to build an automatic   water dispenser while industrial – grade   sensor are extremely efficient , most readymade pre – wired sensor modules are prone to iterated false triggering   which baliy affects the intended performance . you also have to properly mount the sensors so that these are not exposed to strong

Sunlight / ambient   light . these sensor should be covered partially to prevent erroneous operation .

To keep the complexity and cost within limits a reliable IR proximity sensor has been developed with the help of a PLL tone decoder IN NE 567 .

This tone and frequency decoder is a highly stable phase – locked loop (PLL) with synchronous AM lock detection is to drive a load whenever a sustained frequency within its detection band is present at the self – biased input delay are independently and   set using just four external components .

1.3   WATER PUMP DRIVER

Any 3-6 water pump motor should work with this little driver built around transistor t2 (it is recommended to use a prime version water pump for a permanent fixture) just attach a small rubber / silicone hose to the motor outlet , and submerge it in water to run it make sure that the water level is always higher then the motor as dry run will damage that water pump motor in a flash fortunately , we can prevent such a mishap by adding a mini float switch to the wiring of the water pump .

Here , S8550pnp transistor (T2) is used as a high – side switch to driver the water pump motor (M1) since the transistor switches the high voltage on and off (instead of ground) , the set up provides a good return path when the water pump motor is turned off , and hence there's not much undesired electromagnetic interference (EM)

1.4   CONSTRUCTION AND TESTING

Wiring up the circuit is simple you can either use a vero board, or the designed PCB layout given here A PCB layout for the automatic water dispenser is shown fig 3 and its

1.5   HOW DO THIS WORK

In this project, we are using an IR sensor, which detects the presence of a hand or some other object using Infrared Radiation. When a hand is detected, it generates a Digital signal which is sent to the Arduino UNO. When the signal is HIGH, the Arduino makes the Green LED glows and also activates the relay module which turns on the 12v DC water pump and the water comes out from the

1.6 SAFETY MEASURES OF AUTOMATIC SANITIZER

Dispenser   Do not touch the brass nozzle during hand sanitization The electrical connection should be far from children reach Every day the cleaning of the outer body is essential Refill the tank before getting it to drain It should not wall-mount in a Congested place.

1.7   APPLICATIONS OF AUTOMATIC

Dispenser

It mostly used in hotels, restaurants5,schools, offices, homes, hospitals , factories, and industries. During the time of COVID-19, it is one of the most needed product for humankind. It is available mainly at the main gate on any organization, corporate houses, banks, shopping

7 RESULT

An automatic hand sanitizer dispenser machine designed and developed. The machine is wall mount at the entrance gates of society, schools, colleges, or any commercial building. If a hand static in front of the IR sensor then it can always spray. It is a limitation of my project which is not effective in optimizing the use of liquid sanitizer. The machine is tested for 2hour operation for more than 2 days and is working fine. It helped to reduce the contact for getting sanitizer and also reduce manpower employed to spray sanitizer with a spray bottle. The power consumption is very low. For each spray the maximum current consumption is 500 mA at 5 V. It consumes 2.5W if run continuously for 1 hour. The control circuit is small in size and low cost as compared to accessible controllers. The power consumption is low and the system can help to achieve a contactless sanitizer dispenser. It reduces the chance of community transmission of the virus.

8   BENEFITS OF THE PROJECT

Touch-free

Moreover, a more sterile environment is made by the improvement of the automatic sanitizer dispenser. By using the pump, we will leave behind a diversity of bacterial colonies. Then they will interbreed and leads to a more resistant strain of bacteria which can re-contaminate various hands and would not be completely eliminated by the anti-bacterial soap or sanitizer. Wider spectra or higher levels of resistance in the present colonies are due to interaction or complementation between the resistance genes. The bacterial transmission will be wiped out once we stop using and touching the pump.

9   PRESET INCREMENTS

This device will only serve a set amount per motion activation. A specified amount to be dispensed can be set to a highly efficient quantity in which waste will be minimum.

10 . FLEXIBILITY

Besides hand sanitizer, the dispenser's structure also works for other liquids: soap, lotion, laundry detergent, etc. The wide range of possibilities widens the use of the dispenser to various locations other than the bathroom

11 APPLICATION OF THE

- **Public place**
- **Hospital**
- **School & college**
- **Industries**
- **Office**
- **Factory and so on.**

12 CONCLUSION

The automatic hand sanitizer dispenser device proposed in this paper is ultimately expected to contribute to contactless hand disinfection in public places and virus infection prevention. It is economical and eco-friendly by decreasing waste emissions. At present time the world needs this product. It is very demandable for smart and cost-effective devices. But If a hand static in front of the IR sensor then it can always spray. It is a limitation of my project which is not effective in optimizing the use of liquid sanitizer. In the future, I improve this project by using Arduino, which improve the limitation of my project .