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Self-Activating Sanitizer With Battery Imposed System For Cleansing Hands

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***Abstract* –This paper gives a brief idea about the automatic hand wash sanitizer. The motor pumps the sanitizer liquid or solution to the human while detecting the IR Sensor.**

The IR Sensor is the photodiode used for sensing the human hand detection and it is used to control the motor pump from the liquid. The motor is connected to an RC timer delay setup and the pipe connected to a reducer are used to control the flowing liquid of the sanitizer.

It has three modes of Control LED's in the system, White LED is used for the user to understand that the setup is in working mode and battery is in use. Red LED is used for the user to understand that Battery is in charging mode. Green LED is used for the user to understand that battery is in full charged mode.

It has an On/ Off switch to control the whole setup from the battery supply. The consumer is convenient to use the setup and the user also saves costs and power.

Keywords—***Touchless hand wash Dispenser; Automatic hand wash Sanitizer; Dispenser hand wash; Covid-19 Saniti1zer; Covid19, Corona Virus; Sanitation; Battery Imposed System.***

I. INTRODUCTION

The corona virus disease is a major problem in the future world. Presently there is no medicine or vaccine found in the present world. As there is a severe attack in this world, the people are suffering from the corona disease. The corona disease is not a simple virus attack, it makes severe to the human by infecting the respiratory system. The virus disease is heavily spreading in the world, as the nations are trying to monitor and maintain the spread of corona in the nation and other nations. The world is suffering a lot due to this corona virus.

There is a strict evaluation everywhere to control the corona disease and spread to the nation. The hospital and the nurse people are suffering to cure the affected people and stop spreading the virus to the neighbouring people.

The mask and the sanitizer is provided everywhere to protect the people from spreading the virus and to kill the virus from the human hand. The virus is spreading from the human hand and mouth saliva. The mouth spread is controlled with the mask cloth and the human hand is controlled by the hand wash sanitizer. The hand touch while pressing the dispenser usage also spreads from human to human. There should be an automatic hand wash sanitizer dispenser, to control and maintain the spread from human to human.

As there is an impact in using the hand wash sanitation by foot or by pressing the sanitizer bottle used to have a spread of the virus disease from one human to another.

II. EXISTING METHODS

Fig.1 Foot Operated hand wash Sanitizer

A long press is made with the footer, such that the mechanical stress is made on the instrument. The mechanical stress made, is forced to spray out the Sanitizer liquid. The human at aged people is unable to use this system as there is mechanical stress and there is a sudden liquid force coming from the sanitizer bottle.

Fig.2 Automatic Hand Sanitizer with Microcontroller

The Easy Non-Contact Automatic Hand Sanitizer Dispenser or Automatic Soap Dispenser With Arduino, it has the Arduino microcontroller to control the sanitizer liquid with the help of a Servo motor. This is used to power up the system by the external power supply of 6V battery or through computer USB cable. This method is good to use and the drawback is the battery replacement for the usage of the system [1].

III. METHODOLOGY

A. Automatic Hand Wash Sanitation

Since the dispenser has been designed and created by considering a curious understanding of the user and the consumer. There are two ways of automatic hand wash sanitation. One is the without a microcontroller and other is with a microcontroller. The transistors are used to detect and control the motor pump of the sanitizer. The microcontroller is used to control the Sanitizer level, battery level, control solenoid valve and IR detect.

B. Hardware

In Automatic Hand Wash Sanitation with Microcontroller (AHWSWM) has the microcontroller as the main controller to survey the automation. The human hand is detected by the IR Sensor, it sends the signal to the microcontroller, the microcontroller will take action to the solenoid valve, as the human hand gets 2 to 3ml of sanitizer in hand. In Automatic Hand Wash Sanitation without Microcontroller (AHWSWoM) has only the transistors as a switch to control the whole unit.

Essential components used in AHWSWM are:

- IR Sensor.
- Relay.
- Servo Motor.
- Sanitizer box.
- Microcontroller.
- SMPS Power supply.

Essential components used in AHWSWoM are:

- IR Detector.
- BMM.
- 3.7V Battery.
- Setup Switch.
- Control System.
- Pump Motor.
- Sanitizer box.
- 5V 1A Adaptor.

The AHWSWM has a microcontroller to control the whole setup, it has external power supply SMPS to power up the circuit.

The AHWSWoM has the transistor to control the whole setup, it has a battery as the power supply to power and controls the circuit.

The difference between AHWSWM and AHWSWoM is that cost is high, easy to configure and maintain in AHWSWM compared to AHWSWoM.

The BMM is used to charge and discharge the battery at a certain limit of condition. The three modes of control LED is made. The white LED is used for the user to understand that the setup is in working mode. Red LED configures as the battery is in charging mode and the green LED configured as the battery is fully charged. The user can easily identify the setup, at which condition is held. The hardware is cheap, it is easy to buy and handle by automatically.

C. IR Detector

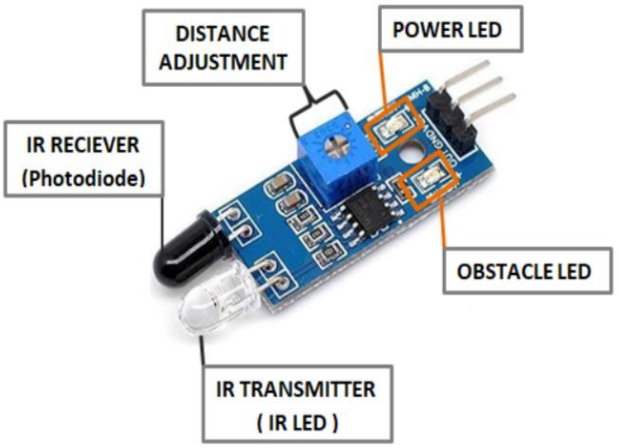

Fig.3 IR Detector

The human hand detector for the touchless sensor. It senses through the infrared radiation. The power LED is used to know that the detector has powered up the module. It has an invisible IR LED as a transmitter and a photodiode LED as a receiver. It has a distance adjustment is the reflection between the transmitter and the receiver sensor.

D. Control System

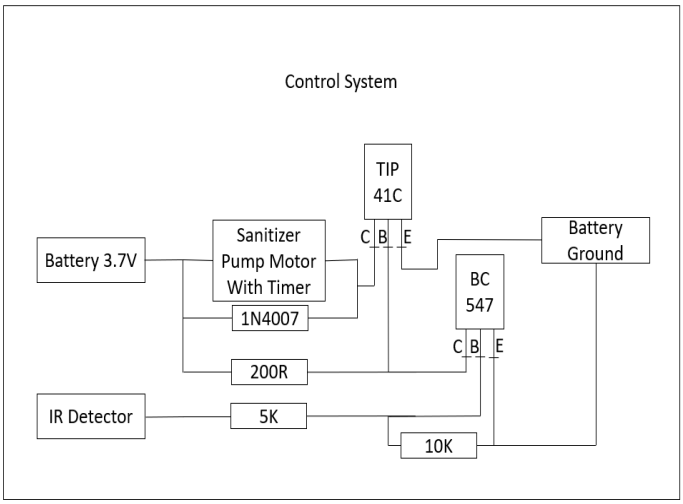

Fig.4 Control System

The Control System has the two transistors connected to the pump motor, IR detector. The TIP41C is an NPN transistor used to control the motor as there is a need of an inverter in the circuit, used as BC547 transistor. The entire circuit is powered and battery operated.

The transistor needs the only 5mA at the base side, so the resistor is used to control the whole system. The transistor acts as an open and close switch, while the IR is detected. The pump motor starts to pump the sanitizer liquid through the pipe with the startup of RC timer delay, it stops the pump motor by 5 Second and the pipe connected to the reducer to control the flow of sanitizer liquid.

E. Battery Management Modes (BMM)

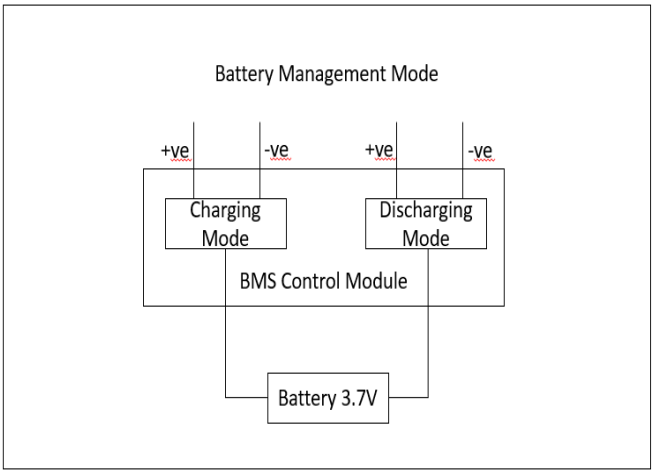

Fig.5 BMM

The battery capacity is 3.7V, 2.6A. The battery can at least withstand of maximum up to 2 days. The rechargeable time is 4 hours. The battery remains constant at 4.2V at full charge and after the discharge, it can withstand up to 2.5V. The life cycle of the battery remains to be good throughout the system. The BMM is used mainly for the system to be handled in everywhere, anyone and anytime.

IV. IMPLEMENTATION AND WORKING

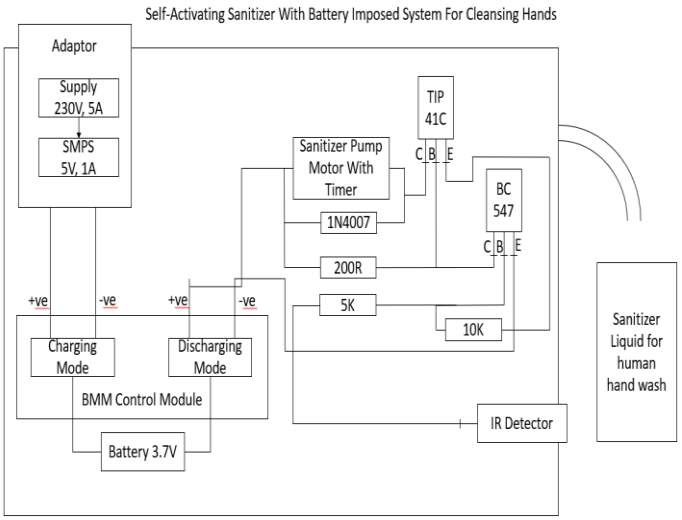

Fig.6 Block diagram of Self-Activating Sanitizer With Battery Imposed System For Cleansing Hands

When the IR signal is detected by the human hand, it sends the signal to the transistors to turn ON the pump motor to supply the droplet of sanitizer to the human hand. The human will be easy to make a handwash without pressing or giving an external touch to the system.

Fig.7 Self-Activating Sanitizer With Battery Imposed System For Cleansing Hands

The motor is operated, when the IR is sending a low signal to the transistor and it is disconnected with there is a high signal. The motor pump is connected to a reducer and it is controlled the flow of sanitizer liquid to the consumer's hand. By the RC timer delay controller and reducer, the Consumer can have only 2 to 3 mL of sanitizer liquid for sanitation.

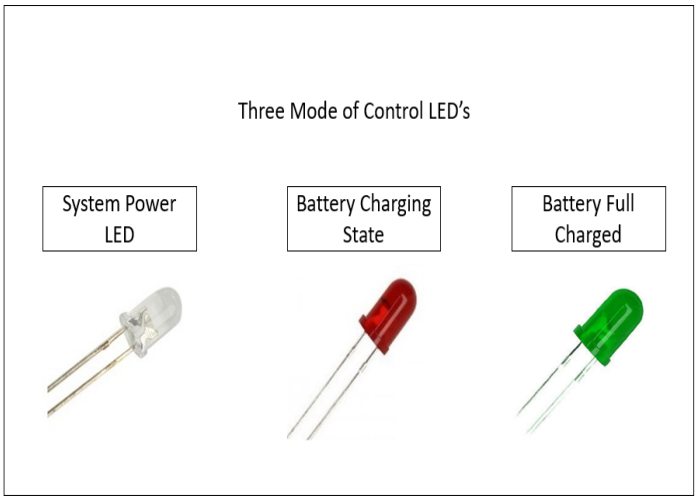

Fig.8 Three Mode of Control LED in System

The White LED is used to make understand the user that the system has powered with the battery mode, the Red LED is used to make understand the user about the battery is in charging state and the Green LED is used to make understand the user about the battery is fully charged and need to unplug the adaptor.

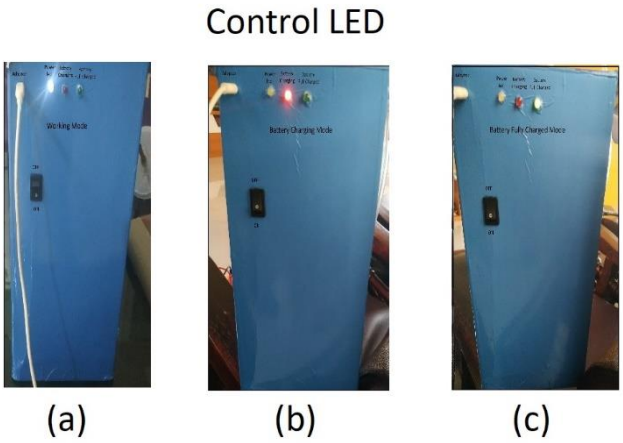

Fig.9 Control LED with Adaptor port with (a) Working Mode, (b) Battery Charging Mode, (c) Battery Full Charged Mode

The three modes of control LED are used for the identification of the system to the user. The Whole system has an ON / OFF switch, to have a save power supply and to use periodically, whenever needed. The adaptor port is availed to charge the battery through the BMM.

V COST ANALYSIS

Cost analysis between exciting microcontroller system compared with Intelligent automatic hand wash dispenser as given in Table1.

Table 1: Cost Analysis

S. No.	List of Instrument	Price (Rupees)
1.	IR Detector	40
2.	BMM	60
3.	3.7V Rechargeable Battery	90
4.	Control System with External Switch	45
5.	RC Timer Delay	10
6.	Pump Motor	90
7.	LED	5
8.	Sanitizer Box	10
9.	Adaptor 5V, 1A	150
	Total	**500**

VI 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 corona disease. This system can be utilised in malls, high populated areas. The economic cost of the project, it will be better quality when considering the life of the system and the project.

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