

# UV STERILIZATION AND SANITIZATION ROBOT

Rachana B. Jadhav\*, Rohini P. Onkare, Pranali N. Mane, Arati J. Jamadade

Dept. of Electronics and Telecommunication Engg , Padmabhooshan Vasantraodada Patil Institute Of Technology, Budhgaon, Sangli, Maharashtra, India

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**Abstract** – Service robots are increasingly present in fields of medicine from military domain to medical one, many applications are developed to improve human life. This project describes the growing role of robotics in healthcare and allied areas with special concerns relating to the management and control of the spread of the novel coronavirus disease 2019 (COVID - 19). The main aim behind the designing of such robot is to minimize person-to-person contact and to ensure cleaning, sterilization and support in hospitals for sterilization purpose our team developed a ultraviolet (UV) sterilization technology which is used in reduction of micro-organisms that may remain on the surfaces after a standard cleaning. Use of these wireless robots reduces risk of infection , cost of traditional cleaning and disinfection.

**Key Words:** Controller, Disinfection, Wi-Fi module, Ultraviolet Sterilization ,Robot ,contactless.

## 1.INTRODUCTION

This global pandemic, stepping in where humans should not, robots are being used for jobs such as sanitizing hospitals and delivering food and medicines, and have proved to be very much useful and handy .We note that the most recent researches in robots and prototypes building are directed to far distant controlled technologies using microcontroller .So, ultraviolet sterilization and sanitizing robot is the current solution in this pandemic. In this project a complete framework presentation of building a low cost robot prototyping based on microcontroller technologies controlled by an Android application capable of ultraviolet sterilization and sanitizing the area safely.

The objective of this project is minimizing human association as much as possible and thus automating the tasks such as sanitization with the help of robots.

## 2. SYSTEM OVERVIEW

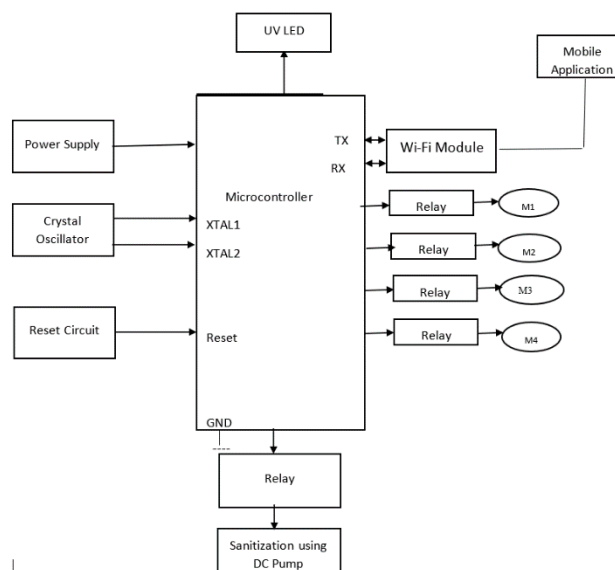


Fig 1. Block diagram of UV sterilization and sanitization robot

In this project , we presented a framework for designing ultraviolet sterilization and sanitizing robot .We build on android application compatible with smartphone capable of controlling the robot from distance so we can stay away from the disadvantages of the robot .The robot includes the UV LED strip for sterilization which is controlled by relay circuit .Our robot is also used for sanitization purpose .Sanitization is done by using sanitization tank and nozzle for spray . We use four DC motors to move robot in desired direction which is controlled by two L293D circuit which is capable controlling two DC motors each , in the same time making the wheels of robot move . The system makes use of wi-fi (wireless fidelity) technology for giving commands to the robot.

### 3. FUNCTIONS ANALYSES

Function analysis is used to set and anticipate the mean needs of our design .It is indispensable to a successful building process. The various devices used in our project are Microcontroller AT89C52 ,Wi-Fi module ,L293D ,motor driver ,sanitization tank , UV lights , Reset circuit ,crystal oscillator ,power supply etc. Descriptions of devices used in project are as follows,

**3.1 Power supply circuit :** For making power supply circuit, we used 12v input battery ,bridge rectifier ,capacitor filter , 7805 voltage regulator and LED indicator .This circuit produces 5v supply at output. This 5v power supply are given in complete circuit through VCC and GND.

**3.2 Crystal oscillator :**11.0592 MHz crystal is connected to XTAL1 and XTAL2 pins of microcontroller ,along with two 33pf capacitor which is used to reduced noise .

**3.3 Reset circuit :** We provide one reset circuit to microcontroller to reset the circuit at min-time between the programming when we press reset button pulse is generated & it goes into microcontroller and then microcontroller is reset

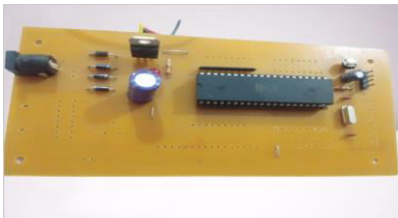


Fig 2.Power supply ,crystal oscillator and reset circuit

**3.4 UV LED and sanitization pump :** We used UV LED strip for sterilization and DC pump for sanitization through spraying nozzles.

**3.5 Relay circuit :** We used five 12v relay circuits .One for DC sanitizing pump and remaining for DC motors of wheels of robot. Relay is used for ON or OFF purpose.



Fig 3.Relay circuit

**3.6 Wi-Fi Module :** It is used to give command to robot through android application.

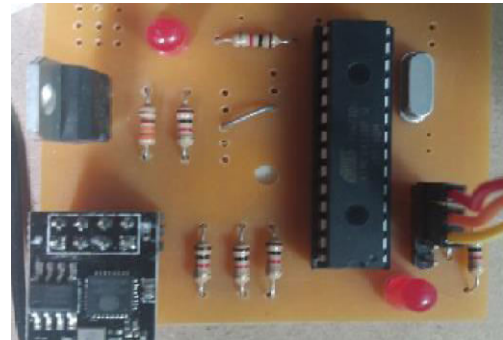


Fig 3. wi-fi module circuit

### 4. SYSTEM ITERFACE

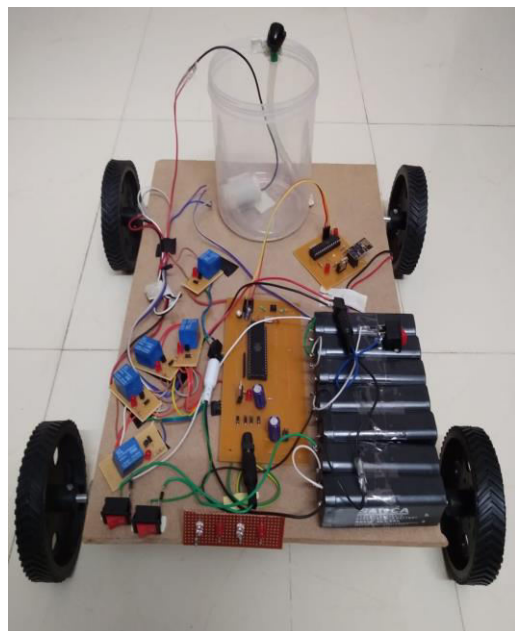


Fig 4. UV sterilization and sanitization robot

### 5. HARDWARE AND SOFTWARE TOOLS

#### 5.1 Hardware :

- Microcontroller
- DC Motor
- Wi-Fi Module (ESP2866)
- Relay
- Power Supply
- DC Pump
- UV LED Strip

## 5.2 Software :

- Proteus for PCB design
- Keil compiler microcontroller embedded C programming.
- Flash magic Web server HTML ,PHP

## 6. Working

The heart of the system is a microcontroller. That is a central command center of the UV robot. It is programmed to accept inputs to navigate the robot around the room.

After getting all setup ready. Power on the microcontroller. Give the commands to robot through android application which is connected via Wi-Fi module .After getting the instructions robots wheels starts to move in particular direction.

## 7. CONCLUSIONS

Main purpose of our project is to reduce the chances of infections and spread of harmful micro-organisms. Also provide a safe environment for the patient and healthcare worker. Robot is operated by a wireless Wi-Fi module, so it is safe for health of human being.

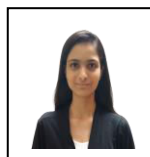
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## BIOGRAPHIES



Ms.Rohini P. Onkare  
Asst. Professor Dept. of E&TC  
Engineering, Padmabhooshan  
Vasatraodada Patil Institute of  
Technology, Budhgaon .



Miss. Rachana B. Jadhav  
Student, Bachelor of E&TC  
Engineering, Padmabhooshan  
Vasatraodada Patil Institute of  
Technology, Budhgaon .



Miss. Pranali N. Mane  
Student, Bachelor of E&TC  
Engineering, Padmabhooshan  
Vasatraodada Patil Institute of  
Technology, Budhgaon .



Miss. Arati J. Jamadade  
Student, Bachelor of E&TC  
Engineering, Padmabhooshan  
Vasatraodada Patil Institute of  
Technology, Budhgaon .