

SURFACE CLEANING DIS-INFECTION MACHINE

Arvind Bhandare¹, Roshan Rote², Dhiraj Khot³, Shubham Patil⁴, Umesh Khond⁵, Nilesh Bachankar⁶

Assitant Professor, Electrical Engineering Dept, SETI, Panhala, Maharashtra, India¹

Students, Electrical Engineering Dept, SETI, Panhala, Maharashtra²³⁴⁵⁶

Abstract – The global COVID-19 pandemic due to the novel corona virus SARS-CoV-2 has challenged the availability of traditional surface disinfectants. The aim of the present work is to contribute the fight against the spread of Covid-19, in hospitals, public transport, class room, and any enclosed areas. In this study, we have adopted the physical disinfection method by using UVC light as agent. The UVC devices are studied and classified according their disinfectant units, combined disinfection agents, mobilities. The robot can kill 99.99% bacteria and virus.

Our UV robot has one 15 watt of UV tube mounted bottom of UV robot body. Our UV robot based on Micro-controller with HC-05 bluetooth controller which operates from any mobile device. In addition, we tested the effective nessof cleaning Corynrbactirium diphtheria, Sarmatia marcescence bacteria sample plates located 2 inches away from our UV robot to be within 10 seconds after exposure of UV light.

Key Words : Ultraviolet light (UV-C), Microcontroller, Disinfection, Bluetooth controller, Robot.

1. INTRODUCTION

As COVID-19 spreads across the world, hospitals have become ground zero for the coronavirus. Surfaces contaminated with SARS-CoV-2 pose a grave threat to the safety of staff and patients. To minimize the risks for their staff, hospitals are utilizing disinfection robots to sanitize surfaces. Read on and learn more about how some of those robots kill 99.99 percent of germs.

Currently, surface can be an excellent way for the spread of dangerous infectious diseases. The number of bacteria, viruses, fungi and parasites present on the surfaces. There are many technologies for disinfection of surface, but the most effective are UV-C tube that clean the viruses. Now Making a disinfection machine using uv-c light (rays) for surface cleaning. That machine will clean the surface and also kill the bacteria. Which is operates on smartphone and machine Control from Microcontroller.

Previously human being was use liquid solution as well as moffer for cleaning purpose. Which was takes

more efforts and huge man power. That time surface cleaned by regularly but not properly. And standard cleaning procedure by using solution by human cannot clean or reduce microorganisms. But Now a days the robot are used for cleaning purpose. Which is operates from mobile device as well as IOT. The robot cleans bacteria, viruses as well as dust and wet surface. The UV-A and UV-B lights are uses for decoration purpose. But UV-C light is uses for cleaning surgical ward in hospital. Which kill 99.9% Bacteria and viruses. So In our robotics system we have used a UV-C light for cleaning. Which is most important now a days because of Covid-19 situation. Our robot is operates from Bluetooth controller which reduce human effort and secure from corona virus. The Microcontroller based robot useful in covid center also hospitals and homes.

Therefore to eliminate all the problems on Covid-19 situation, our team designed UV-C type robot that can operates by using mobile phones in room which clean entire with or without human interaction.

2. MODEL DESIGN

Apart from Arduino, which is the main controlling module of the project, there are two other important modules that you have to be familiar with in order to implement the Bluetooth Controlled Robot project. They are the HC-05 Bluetooth Module and the L298N Motor Driver Module.

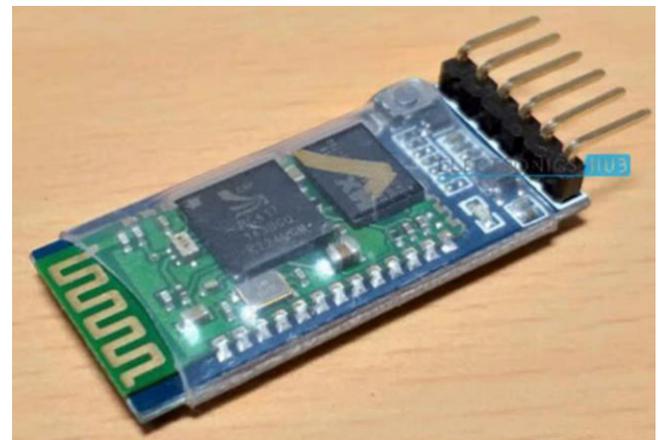


Fig -1: Bluetooth Module

Philips TUV 8W G8 T5 UVC Lamps distribution channel partner of Philips special lighting-Netherland also we have stock of osram display optic lamp.

We are a leading stockiest & trader of Philips uv lamps - uv-c germicidal 254nm such as Philips uv lamp tuv 16w 4p tuv 20w 4p tuv 25w 4p se unip tl mini 4pin and tuv 36t5 4p se unip also tuv 130w xpt se amalgam, Philips tuv 325 ho xpt se 4pin 325w amamotor



Fig -2: UV c type tube.

The L298N Motor Driver Module is responsible for providing the necessary drive current to the motors of the robotic car. I have provided information about L298N Module in an earlier project called Arduino DC Motor Control using L298N.

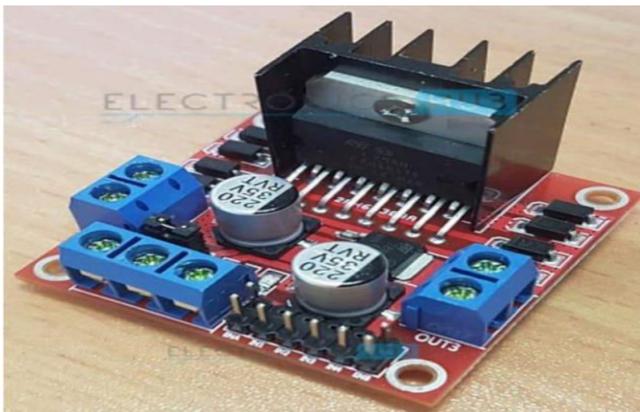


Fig -3: L298 Motor Driver Module

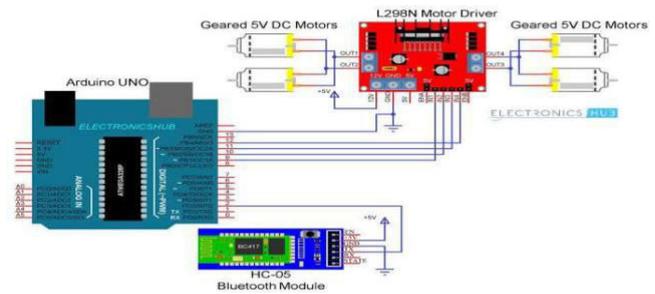
12v Dc Square Gear / Geared Motor 10 Rpm - High Torque Is A Very High Torque Motor Which Should Be Used To Make Big Robots Or Robotised Platform. Gear Box Is Built To Handle The Stall Torque Produced By The Motor. Drive Shaft Is Supported From With Metal Bushes To Give Strength.



Fig -4: 12v Dc Square Geared Motor

The following is the circuit diagram of Bluetooth

Controlled Robot using Arduino, L298N and HC-05.



Circuit Design

I Module are connected to +5V and GND of Arduino. Since I will be only transmitting data related to the Robot's movement from Android Phone to Bluetooth Module and do not intend to receive any data from Arduino, I wouldn't go into the details of the construction of the robot as your robot chassis might be different from mine and you can easily figure it out how to build the robot from the available parts and possible cable management for making the robot more appealing. Coming to the design of the circuit, first is the HC-05 Bluetooth Module. The +5V and GND pins of the Bluetooth ill connect only the TX pin of the Bluetooth Module to RX Pin of Arduino.

This RX pin of Arduino is based on Software Serial library (Pin 2 and Pin 3 are configured as RX and TX on Arduino). The RX pin of the Bluetooth is left open.

Now, the L298N Motor Driver Module. Digital I/O Pins 9 through 12 of Arduino are configured as Input pins of the Motor Driver and are connected to IN1 through IN4 of the L298N Motor Driver Module. Both the Enable Pins are connected to 5V through provided jumper.

The robot chassis which I am using in this Bluetooth Controlled Robot Car project is supplied with 4 geared motors. Since L298N has slots for only two motors, I have joined the left side motors as one set and the right side motors as other set and connected both these sets to the output of L298N Module.

Android App:

If you remember the HC-05 Bluetooth Module tutorial, I have used a simple app called Bluetooth Controller, which is installed on an Android Phone to communicate with the Bluetooth Module.

In this project, I have used the same app with modifications in the data to be transmitted.

The above given Arduino code is written to synchronize with the data configured in the Bluetooth Controller App.

Working:

Assemble the robot, make the necessary connections and upload the code to Arduino. If you understood the HC-05 Bluetooth Module tutorial, then understanding the Bluetooth Controlled Robot project is very easy. First, in the Android App, I have used 5 keys as Forward, Reverse, Left, Right and Stop. The

corresponding data associated with each key is as follows:

- Forward – 1
- Reverse – 2
- Left – 3
- Right – 4
- Stop – 5

When a key is pressed, the corresponding data is transmitted to the Bluetooth Module from the Phone over Bluetooth Communication. In the Arduino code, the Arduino UNO receives any of this data from the Bluetooth Module (as per the key pressed) and performs a simple switch case operation, where each case associated with appropriate instructions to the Motor Driver Input Pins.

For example, if 'Forward' key is pressed in the Android Phone, then '1' is transmitted. Arduino will then make IN1 and IN3 as HIGH and IN2 and IN4 as LOW to achieve a forward motion.

Similarly, other keys correspond to appropriate setting of IN1 – IN4 pins.

CONCLUSIONS

From lab test results of disinfection test, UV robot requires at least 10 second to clean or kill the bacteria and viruses. Our rounded 15 watt UV tube requires 230 V supply provided by inverter connected to battery.

Our UV robot has killed 99.99% bacteria and viruses Which is operates from Bluetooth controller which operates from mobile device.

Because of Bluetooth controller the robot are move easily. Also maintain a distance between patients and keep environment safe.

Which is most important thing in Covid situation. The UVC-robot integrated environmental disinfection is an important strategy to protect health-care workers

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