

Hospital disinfection Robot using UV Light and Bluetooth Control

<https://www.youtube.com/watch?v=5NKYI70d-MM>

This project presents the design and implementation of a voice-controlled robot integrated with a UV lamp control system using a Bluetooth-enabled mobile application. The system utilizes an Arduino Uno microcontroller as the central processing unit, which receives voice commands from an Android smartphone via a Bluetooth module. These commands are processed and translated into control signals for robot movement and UV lamp operation.

The robot's motion is achieved using DC motors driven by an L298 motor driver, allowing directional control such as forward, backward, left, and right movements. Simultaneously, a relay module is interfaced with the microcontroller to switch the UV lamp ON and OFF based on user commands.

To enhance safety and automation, an ultrasonic sensor (HC-SR04) is integrated into the system for obstacle detection. The sensor continuously measures the distance between the robot and nearby objects. When an obstacle is detected within a predefined range, the system automatically stops the robot to prevent collisions, ensuring safe operation even in unknown or hazardous environments. The system is powered by a regulated 5V DC supply for logic circuits and a separate motor supply for efficient motor operation.

This project demonstrates a user-friendly, wireless control mechanism that enhances convenience and accessibility. The integration of a UV lamp makes it suitable for applications such as disinfection, sanitization, and hazardous environment operations where human presence is limited. The addition of obstacle detection further improves reliability and safety. Overall, the system provides an efficient, low-cost, and flexible solution for remote robotic control using voice commands.

The features of the project are:

- Controlled using voice commands from a mobile phone
- Uses Bluetooth for wireless communication
- Moves in forward, backward, left, and right directions
- UV lamp ON/OFF control through mobile
- Built using Arduino Uno
- Uses L298 motor driver for motor control
- Relay module to control UV light
- Safe remote operation of UV light.
- Automatic Obstacle detection using SR04.

The main blocks of this project are:

- ✓ Battery power supply.
- ✓ Arduino UNO Microcontroller.
- ✓ Bluetooth module.
- ✓ DC motors with driver.
- ✓ Relay along with UV light
- ✓ LED indicators.
- ✓ Ultrasonic sensor.

Software's used:

1. Embedded C programming.
2. Arduino IDE programmer for dumping code into Micro controller.
3. Express SCH for Circuit design.

Block diagram of the project:

Block Diagram

