

# Android app-based floor cleaning robot

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## ABSTRACT

This project describes the evolving 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 (COVID19). The prime utilization of such robots is to minimize person to person contact and to ensure cleaning, sterilization and support in hospitals and similar facilities such as quarantine. This will result in minimizing the life threat to medical staffs and doctors taking an active role in the management of the COVID19 pandemic.

**Keyword:** - *Arduino UNO, Android, Cleaning, Bluetooth*

## 1. INTRODUCTION

The project aims in designing a robot that can be operated using Android mobile phone. The controlling of the Robot is done wirelessly through Android smart phone using the Bluetooth feature present in it. Here in the project the Android smart phone is used as a remote control for operating the Robot. Android is a software stack for mobile devices that includes an operating system, middleware and key applications. Android boasts a healthy array of connectivity options, including Wi-Fi, Bluetooth, and wireless data over a cellular connection (for example, GPRS, EDGE (Enhanced Data rates for GSM Evolution), and 3G). Android provides access to a wide range of useful libraries and tools that can be used to build rich applications. In addition, Android includes a full set of tools that have been built from the ground up alongside the platform providing developers with high productivity and deep insight into their applications. Bluetooth is an open standard specification for a radio frequency (RF)-based, shortrange connectivity technology that promises to change the face of computing and wireless communication. It is designed to be an inexpensive, wireless networking system for all classes of portable devices, such as laptops, PDAs (personal digital assistants), and mobile phones. It also will enable wireless connections for desktop computers, making connections between monitors, printers, keyboards, and the CPU cable-free. The controlling device of the whole system is a Microcontroller. Bluetooth module, DC motors are interfaced to the Microcontroller. The data received by the Bluetooth module from Android smart phone is fed as input to the controller. The controller acts accordingly on the DC motors of the Robot. The robot in the project can be made to move in all the four directions using the Android phone. The direction of the robot is indicated using LED indicators of the Robot system. In achieving the task the controller is loaded with a program written using Embedded 'C' language.

## 2. COMPONENTS REQUIRED

### 2.1 Battery:

It stores the amount of power generated by the piezoelectric and the solar panel that can be used in further generations.

### 2.2 DC MOTOR:

A DC motor is any of a class of rotary electrical motors that converts direct current (DC) electrical energy into mechanical energy.



**2.3 IR Sensor:** IR sensor work with radar technology and they both emit and receive infrared radiation. This radiation hits the objects nearby and bounces back to the receiver of the device.



Fig.2 IR sensor

**2.4 Arduino UNO:** Arduino UNO is a microcontroller based on ATmega328P. It has 14 digital I/O pin.



Fig.3 AT mega 16

**2.5 Bluetooth Module (HC-05):** Zero level PCB is to mount the microcontroller, voltage regulator and IC's.

**2.6 Jumper Wires:** It is used as a connector between the components and the micro controller.

**2.7 L293D Motor Driver:** It helps to drive dc motor.



Fig.4 L293D motor driver

**2.8 LED:** A light-emitting diode is a semiconductor light source that emits light when current flows through it.

**2.9 Capacitor:** A capacitor is a device that stores electrical energy. It is a passive electronic component with two terminals



### 3. ACCESS TECHNOLOGY

Since Bluetooth operates in the unlicensed ISM band that is also used by another devices such as garage door opener, microwave oven etc.

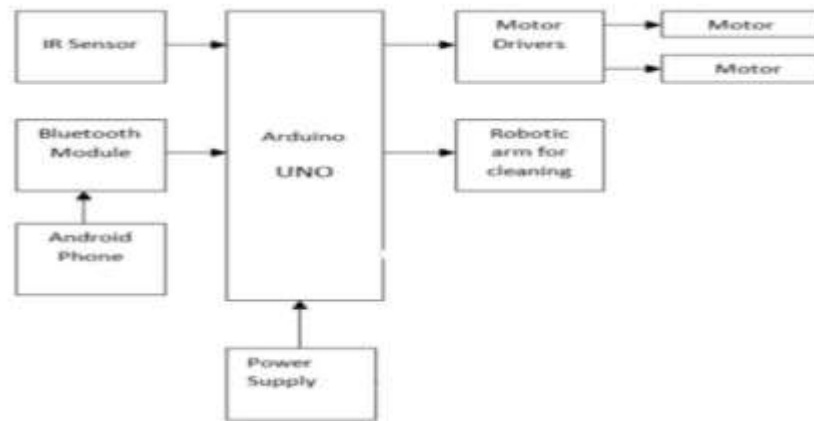
### 4. IMPLEMENTATION

The project is implemented on breadboard and the breadboard itself is used as the chassis for the robot car. The Bluetooth module HC05 is connected to the Arduino board through simple single strand wires. The transmission pin of Bluetooth module is connected to the transmission pin of the Arduino. The Digital pins 9,10,11 and 12 of Arduino board are connected to the pins 4,10,7 and L298N motor driver IC respectively

### 5. CONCLUSION

Products designed in this way are fully functional and provide the desired movement. It is tested in the room and leads to successful results. Manual floor scrubbers are an alternative to automatic floor cleaning machines in the event of a power outage. The body is controlled by machines to achieve dry and wet conditions. Cleaning and polishing can be done at the same time, reducing manual labor and time. The design is very simple and easy to manufacture. Overall, the concept is very useful and there is a lot of room for improvement in machine parts. Optimization continues until the best results are obtained. Overall, the project is a success and will definitely change the era of robotics and floor cleaning. In terms of automation, Algorithm is designed to be 90% efficient, which is too high for the current scenario. Can be developed in sensing field.

### 6. BLOCK DIAGRAM



## 7. FUTURE SCOPE

The scrubber design should be modified in future because the current design has few problems. Few of those are the motor is not detachable and the high rpm leads to vibration of the whole system. If these features will be modified, this will work well. The development can be made in the field of sensing and to detect as well as move in the direction of dust and thus resulting in better cleaning of floors. Monitoring, self-charging, lighter body weight and to set alarm on/off time manually are the future scope of this paper.

This project will be further implemented on platform like AVR, ARM microcontroller etc. More can be done in the process of UART communication control and many challenges will be carried out to increase reliability and efficiency. This system also can be developed by using GSM technology. The knowledge is ever expanding and so are the problems which the mankind strives to solve. In this spirit, it is hoped that the current activity will lead to further enhancements. For example; work on future for military purpose by the robot.

## 8. ACKNOWLEDGMENT

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