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# Design and Development of Floor Cleaner Robot (Automatic and Manual Mode)

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**ABSTRACT:** In the present-day scenario all the members of family are busy with their work and are not getting proper time to clean the house. The cleaning robot helps to clean the floor. This is done by simply pressing a switch and the robot does the work. This also cuts down the labour used in factories for cleaning floor. Above being the case, motivated for the design and development of an automatic cleaning robot that does all the cleaning work with a simple press of a button. This robot can be controlled manually with the help of a mobile Bluetooth. The main motto of the project is to make this affordable and suitable for the Indian users and factories. The development of the robot starts with the design of a simple and most effective chassis for the robot which is a very important part as it has to carry all the weight on the robot. The electronics part where, the type of motor and its specification that should be used to run the bot, the sensors to be used, the microcontroller, the motor drivers, The wheels and other electronic components to be used on the robot are decided. Further, the assembling of the components will be done and finally testing and calibrating the device. A robot which is capable of efficient dust cleaning of the floor of a given room is the main aim of the robot. It is aimed to make the robot economic and feasible for the economic class society. The target time of operation of the robot is one hour. The developed robot will be useful for the household application and industries. This helps to keep the workspace and house clean without the physical labor. Also, the device will clean the room with a single switch of button.

**KEYWORDS:** Floor cleaner, automatic cleaning, motor drivers, Bluetooth.

## I. INTRODUCTION

In recent years, robotic cleaners have taken major attention in robotics research due to their effectiveness in assisting humans in floor cleaning applications at homes, hotels, restaurants, offices, hospitals, workshops, warehouses and universities etc. Basically, robotic cleaners are distinguished on their cleaning expertise like floor mopping, dry vacuum cleaning etc. Some products are based on simple obstacle avoidance using infrared sensors while some utilize laser mapping technique. Each cleaning and operating mechanism of robotic floor cleaners has its own advantages and disadvantages. For example, robots utilizing laser mapping are relatively faster, less time consuming and energy efficient but costly, while obstacle avoidance-based robots are relatively time consuming and less energy efficient due to random cleaning but less costly. Countries like Pakistan are way back in manufacturing robotic cleaners. Importing them from abroad increases their costs. The main objective of this work is to provide a substantial solution to the problem of manufacturing robotic cleaner utilizing local resources while keeping it low costs.

## II. LITERATURE REVIEW

Recently there is surge of innovative cleaner robots in the market. All these robots are based on the technical analysis of research work published in some of the papers described below. Manreet Kaur and Preeti Abrol, in the paper “Design and development of floor cleaning robot” have made the cleaning using automatic and manual modes. They have used RF modules for wireless communication between remote and robot having range of 50m. In the automatic mode, robot controls all operations itself and changes the lane in case of hurdle detection and moves back. In the manual mode keypad is used to perform the expected task and to operate the robot. The drawback in this model is that it does not have the feature of self-charging. Systematic cleaning was an important feature and modifications to the environment to support the navigation of the robot. Many more systems were proposed and among that is the system proposed by J.Y. Sung, R. E. Grinter and H. I. Christensen in “Housewives domestic robot technology international journal of social robotics”. In this paper a new type of home intelligent cleaner adopted the ultrasonic and IR sensor array which had the function of real time environment perception is introduced and the cleaner is driven by step motor has the ability of autonomous working by itself and the functions of automatic detection and obstacle avoidance. This paper adopts grid scan algorithm placed on electric map, realize floor coverage task and designs synthesis detection



system based on sensor array finding method technology according to algorithm characteristics. However this system did not support wet detection and it only performed dry cleaning. Therefore we are proposing a system to overcome the drawbacks of the existing system.

### III.HARDWARE USED

- a) Arduino UNO
- b) Ultrasonic, IR sensor
- c) Motor driver
- d) Suction unit (Vacuum, Scrubber)

### IV.BLOCK DIAGRAM

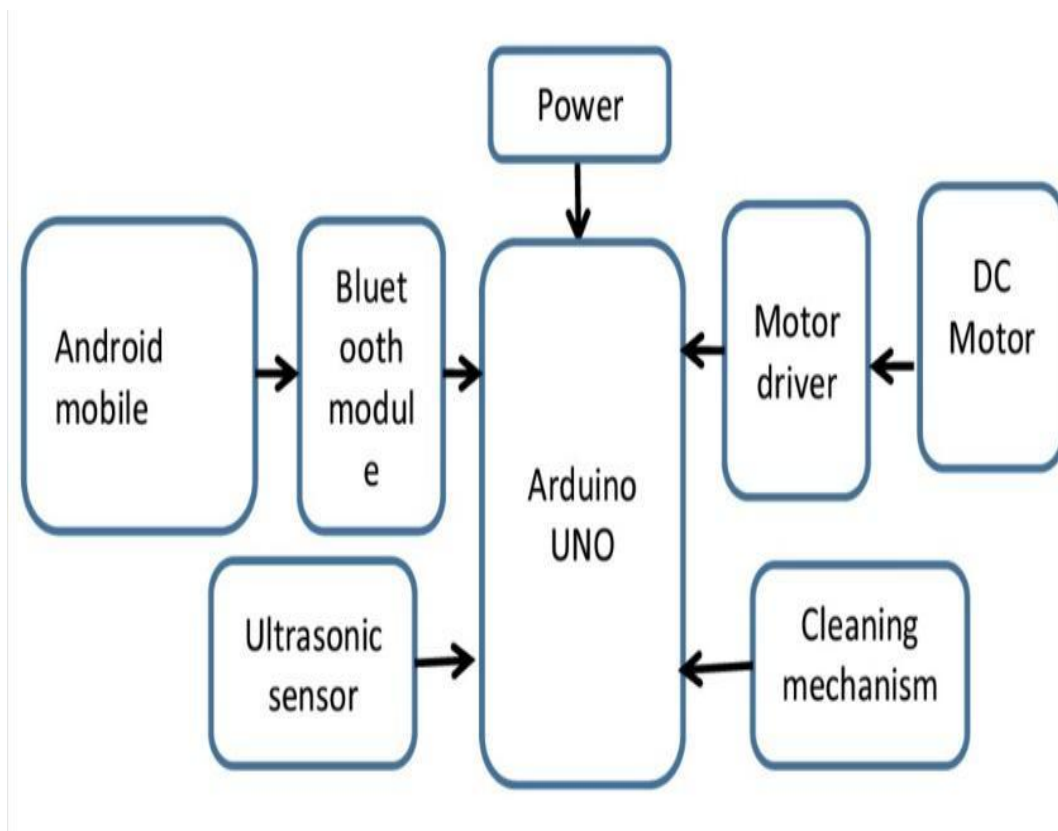


Fig.1 Block Diagram

### V. WORKING

For the aimed feature of application, the robot will be provided with sweeping and vacuuming the floor simultaneously. As soon as a obstacle is detected the robot stops and moves reverse and then checks whether to move left or right . This application is done with help of us sensor . The robot is fitted with rotating brushes parallel to the cleaning surface and rotating in opposite directions such that the dust in the way is collected and fed to the vacuum mouth which is just behind the rotating brushes. Robot moves till it is switched off . Once the user needs it to be manual then he can switch it on so that he or she can control it via mobile phone with android mobile app “ Arduino Bluetooth RC car.



VI. FLOW CHART

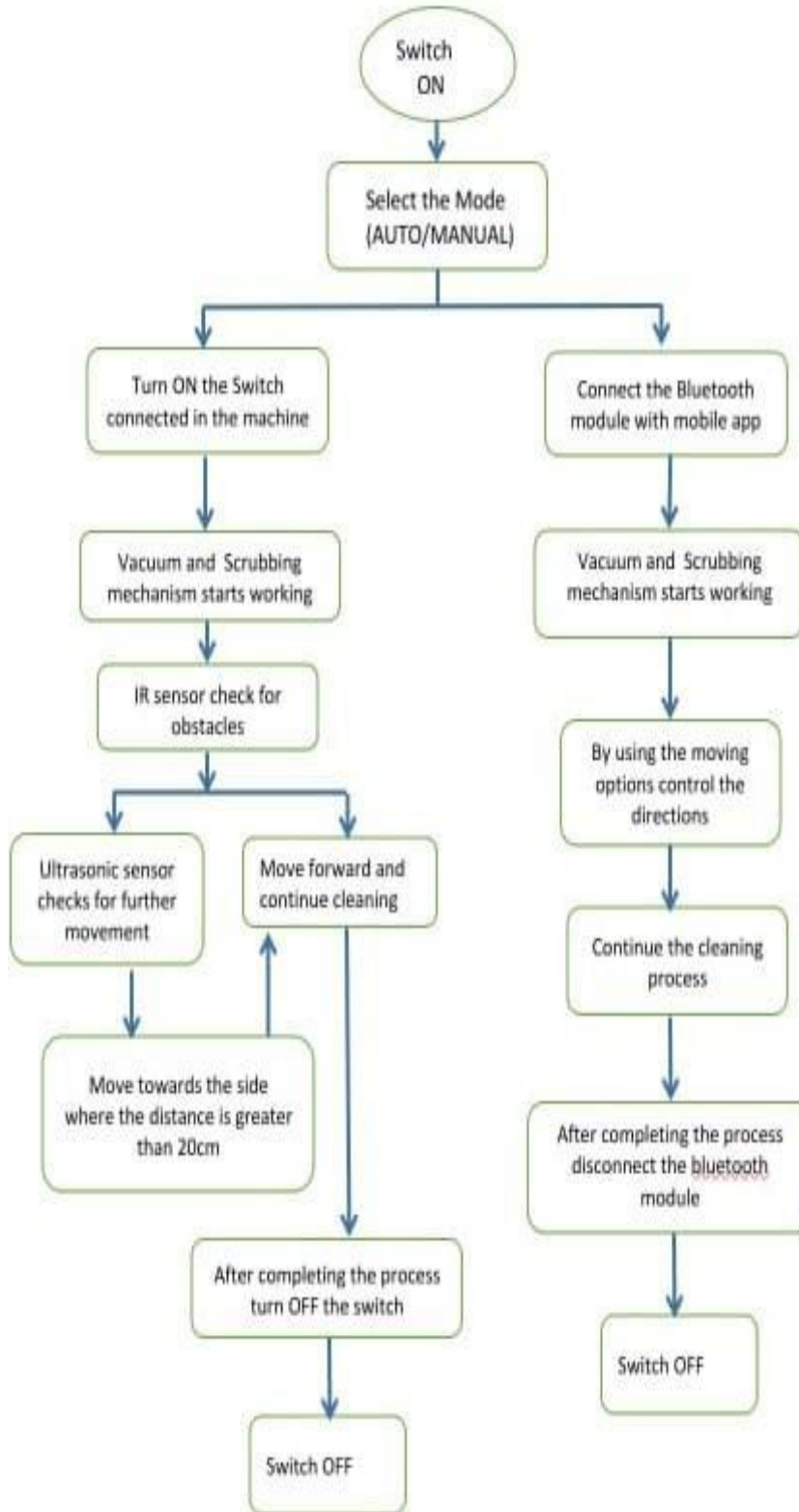


Fig.2 Flow chart of working

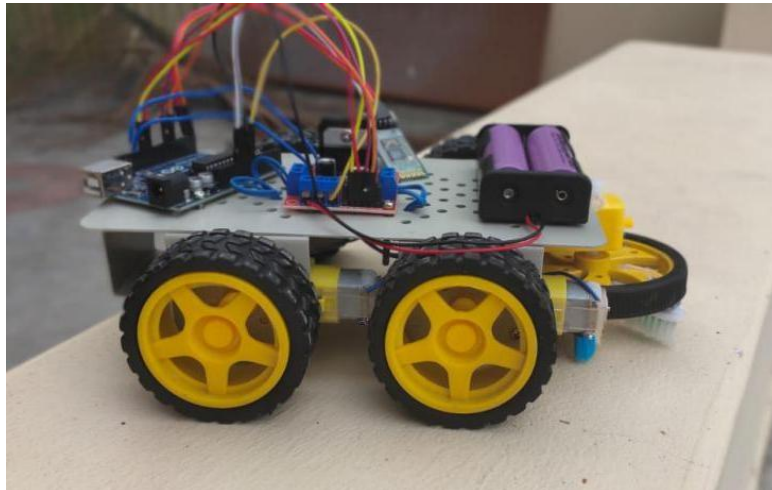




## VII. PROJECT PICTURE



**Fig.3 Hardware kit left side view**



**Fig.4 Hardware kit Right side view**

## VIII. ADVANTAGES

1. It reduces human energy and efforts. People in cities have irregular and long working times. In such a situation a person will always find ways of saving time.
2. Helping physically disable person is also advantage of this project. Automatic mode of this robot helps physical disable person.
3. We can use this robot in Automatic and Manual mode also. Easy mounting and easy to operate. Due to that, it is user friendly.

## XI. APPLICATIONS

1. Main purpose of this project is Cleaning.
2. We can save our time by using this robot.
3. Able to go under furniture and around corners

## X. CONCLUSION

This research facilitates efficient floor cleaning. Since in project the floor cleaner is incorporated with different devices like DC motor(s), ultrasonic sensors etc., so it will be easy to handle it also saves time and will work automatically for cleaning purpose at homes and offices. With simple algorithm and program, the cleaner will be able to cover large floor areas as well as find its way into and out of small corners. As the cleaner traverses the room, the sweeper installed in it



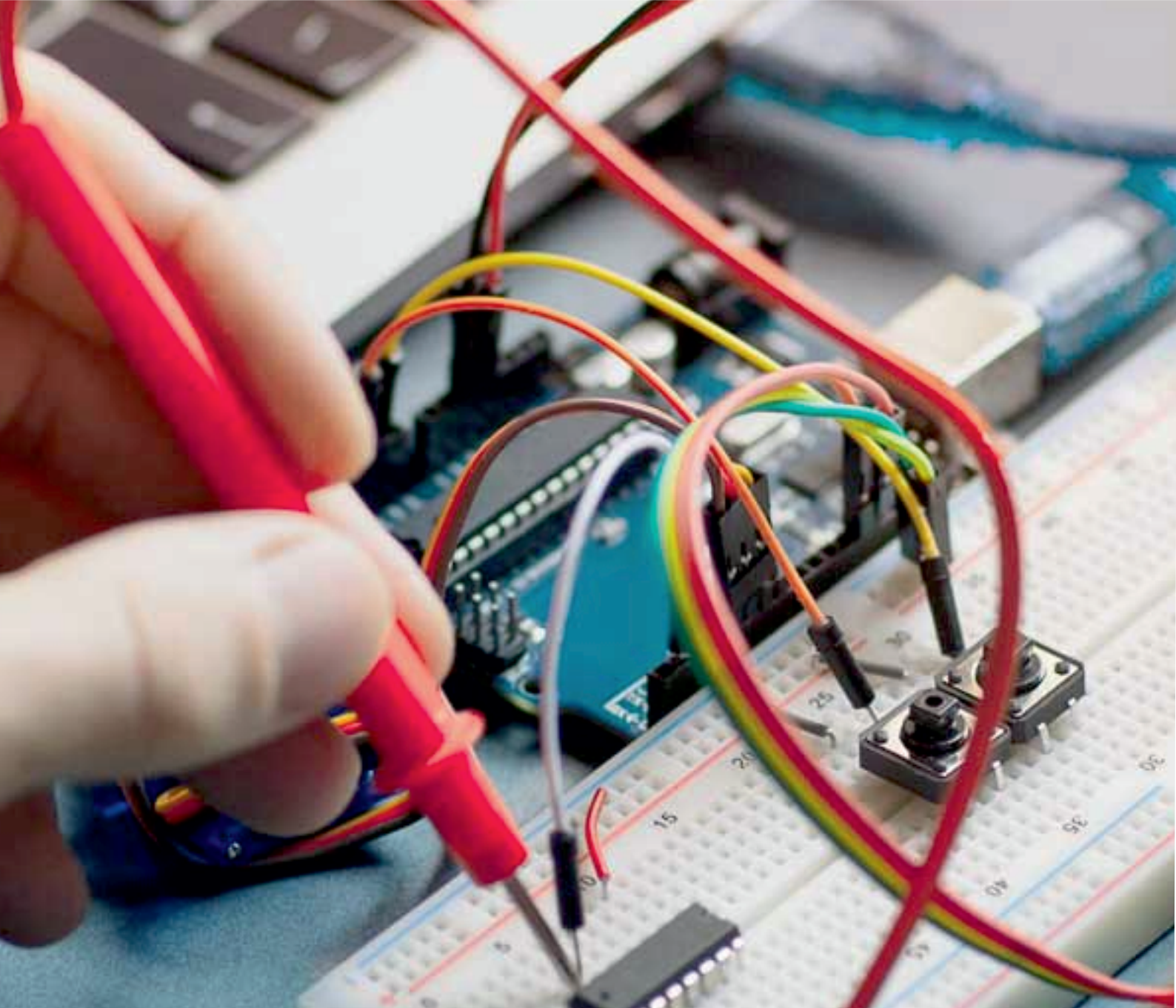
will manage to pick up a significant amount of dirt. Manual Sweeping might not be that effective as it will not be picking up everything in as it is not in sight but using the automatic floor cleaner it can be done easily

## XI. ACKNOWLEDGEMENT

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