

Autonomous Smart Floor Vacuum and Cleaning System

Shirsath Samruddhi¹, Nagare Nikita², Jondhale Pranita³, Machindra Gaikar⁴

^{1,2,3,4}Students, Department of Electronics and Telecommunication Engineering
Pravara Rural Engineering College, Loni, Ahmednagar, India

Abstract: This paper represents the low cost technology that proposed the working of robot for vacuum and floor cleaning. Households of a today's generation are becoming smarter and more automated, that's way the smart cleaning robot to makes the boring household works to simpler and automatic. The main purpose of this robot is to reduce the human interaction in the cleaning process by using Controller, Motor, Ultrasonic sensor, to achive the goal of this project. The whole circuitary is connected with a 12V battery. The proposed system has mopping section ,vacuum section and fan section. Mopping section consist of a mop attached to the robot which is used for cleaning the floor. It is attached to a small water container from which water dipped on the floor. The vacuum section consists of vacuum pump for sucking the dust particles. The wet section consists of fan to dry the floor. The robot can be controlled by mobile applications, which can turn it ON/OFF, directions etc.

Keywords: Microcontroller, Ultrasonic sensor ,Bluetooth module, Vacuum Cleaner, Brushes, Motor Driver IC, Fan.

I. INTRODUCTION

Robot vacuum cleaners are helpful products in today's busy life .Still there are continuously new products introduced on the market, with new or improved functionality. Cleaning is the biggest problem in our house ,school, colleges ,hospitals and offices etc, that's why we are launching this product. Robot cleaner are used for removing dust particles and cleaning the floors.

In the market there are various same products like this , but we are added some extra features in our product such as removing dust particles, cleaning the floor and dry the floor at a time. The main aim of our product is that to provide a all functionality in one product.

Their search and development of an autonomous mobile robot and a manual phone application control prototype able to vacuum cleaning room or even an entire house is not a trivial challenge. These robot operate semi-or fully autonomously to perform services useful to the well-being of human and equipment. With the aim of keeping our robot as simple as possible, while able to perform the initial goals, i.e. an autonomous vacuum cleaner robot able to randomly navigate through a room or a house with the minimum human assistance, the following specification were found;

- Obstacle avoidance
- Mobile operated
- Automatic system

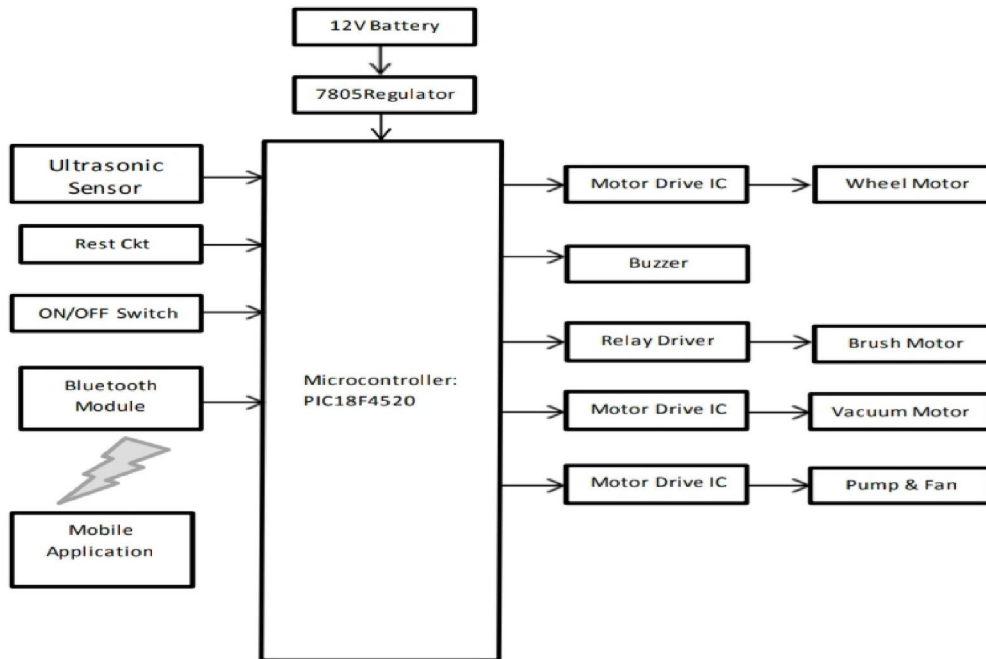
This is an autonomous smart floor vacuum and cleaning robot based on microcontroller (PIC18F4520). In this robot we are using DC motor , vacuum motor, brush motor ,wheel motor , ultrasonic sensor, LCD display, buzzer, regulator, 12V battery and fan. It is mainly used to clean the area through the vacuum section . The sensors are used to detect obstacles and motors will guide it in proper direction and the vacuum section will clean the garbage coming in its way. The microcontroller use to control the motor movement. It takes the signals from the ultrasonic sensors and it drives the motor according to the input which is provided from the sensors output. This whole product operates on the mobile application (Bluetooth terminal).

II. OVERVIEW

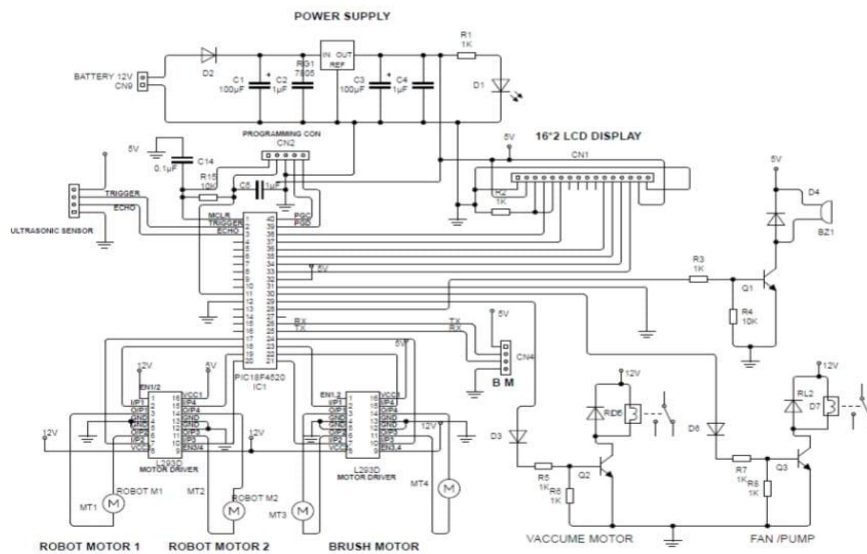
We have designed a autonomous smart floor vacuum and cleaning system robot, that's work its itself. In this designing we have used different sensors and motors. All the handling is done through the microcontroller and mechanisms are done simultaneously.

III. HARDWARE SYSTEM

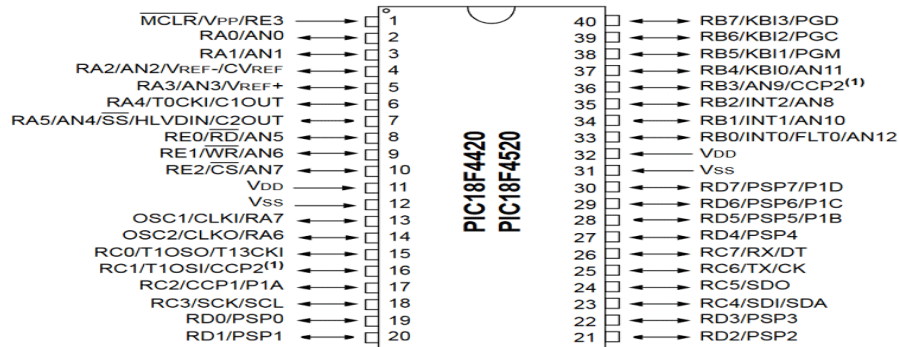
Block Diagram :



Circuit Diagram :



Microcontroller(PIC18F4520):



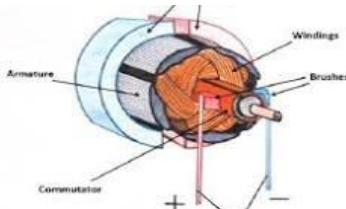
In this model we are using microcontroller (PIC18F4520).In this system collected a data from different sensors and send to the microcontroller. It is an 8-bit enhanced flash PIC microcontroller.

Ultrasonic Sensor :



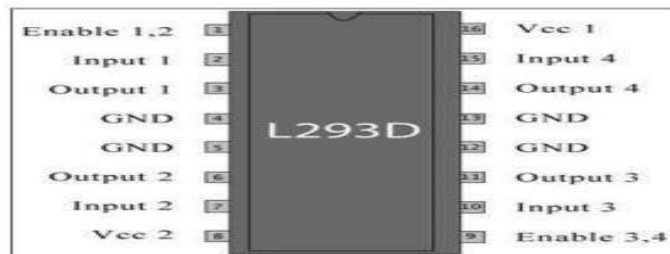
In this system we are using ultrasonic sensor that is attached in front of the model to detect the obstacles

DC Motor :



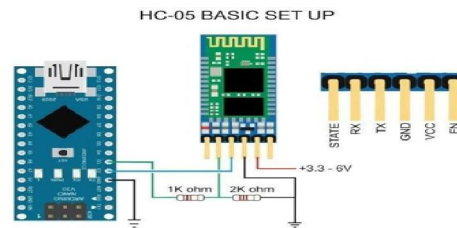
This DC motor provides the movement to the Direction control 30 rpm geared motors provide the necessary forward motion on the floor, powered by 12V batteries and the directional control is established using a program able micro controller, manually controlled using Bluetooth control module.

Motor Driver IC:



A very easy and safe is to use popular L293D chip. It is a 16- pin chip. The pin configuration of a L293D along with the behaviors of motor for different input conditions. The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V.

Bluetooth Module :

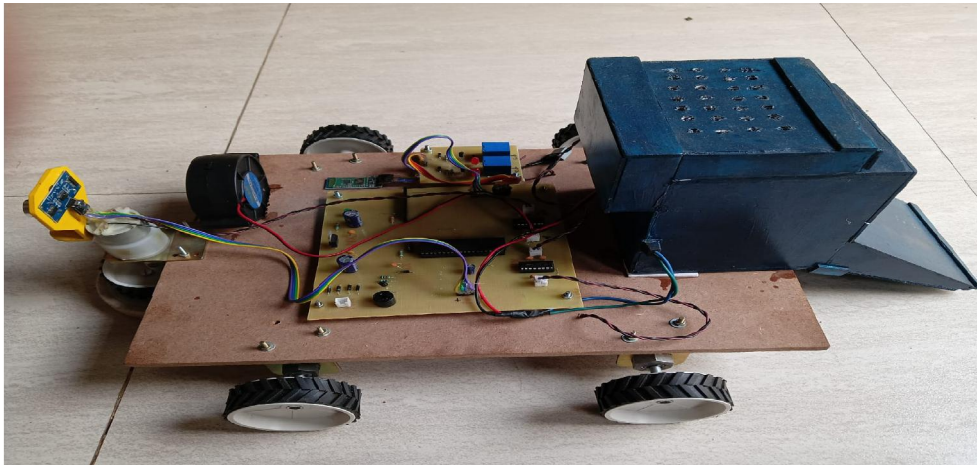


For the communication of the robot with the cell phone or a mobile we are using the Bluetooth device. The Bluetooth device (HC-05) is attached to the robot that receives the data from the mobile and also it can transmit the data.

Battery & Charging:

Batteries are probably the best solutions for electrification of a moving object. They can be recharged during activity by solar panels and during inactivity by a battery charger. Things to consider choosing batteries are the maximum continuous output current and the maximum voltage it can provide. Also, the weight of the batteries can be a factor to consider. The maximum continuous output current can be increased by parallel connection of batteries. The maximum output voltage can be increased by serial connection of batteries.

IV. RESULT AND DISCUSSION



By this autonomous smart floor vacuum and cleaning system is useful for old people, physically weak people and busy people. With the help of this system people can easily clean their indoor and outdoor floor without any efforts.

V. CONCLUSION

In conclusion we introduced an autonomous smart floor vacuum cleaning system . Is capable of performing vacuum ,mopping and drying. This robot works on automatic mode for users convenience. This proposed work provides the hurdle detection in case of any obstacle that comes in it way. This robot will do all the features with good efficiency. The application of this system is collage , home , office and cafe.

VI. ACKNOWLEDGEMENTS

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