Smart Floor Cleaning Robot

[1]Shubhangi Karhadkar, [2]Bushra Pathan, [3]Mrs. S.G.Watve
[1]Student, [2] Student, [3]Assistant Professor
[1, 2, 3] P.E.S. Modern College Of Engineering, Pune, Maharashtra, India

Abstract: Smart Floor Cleaning Robot is a system that cleans the floor with the help of a stabilized and rapidly functionalized electronic control and mechanical system. The purpose of this project is to design and implement a smart floor cleaning robot prototype which is capable of doing dry as well as wet cleaning. The robot is designed to make cleaning process easier thereby reducing human efforts and time.

***Index Terms*—Arduino Uno, HC-05 Bluetooth Module, HC-SR04 Ultrasonic Sensor.**

I.INTRODUCTION

Household Cleaning is a repetitive task carried out by a number of people every day. Hence there is a need of a technology, which will help us to do this repetitive task easily. Here we have designed a smart-phone operated cleaning robot. Proposed project is a combination of hardware and software. It consists of microcontroller, motors, an android phone, an android application and finally a Bluetooth Module via which the hardware connects the software. This robot is an electric home appliance which works in two modes Manual and Automatic as per user's convenience. Unlike other floor cleaning robots this robot is not a vacuum cleaner robot; it performs both dry cleaning and wet cleaning.

II.SYSTEM SPECIFICATIONS

1) Supply: 12V DC Battery for robot's movement, water-pump, fan and wiping mechanism.5V DC for Arduino Uno.
2) Communication Method: Serial Communication using Bluetooth Module.
3) System Coverage Area: 10m
4) For Establishing Connection and Giving Commands: Android Phone & Bluetooth Chat Application.

III. BLOCK DIAGRAM

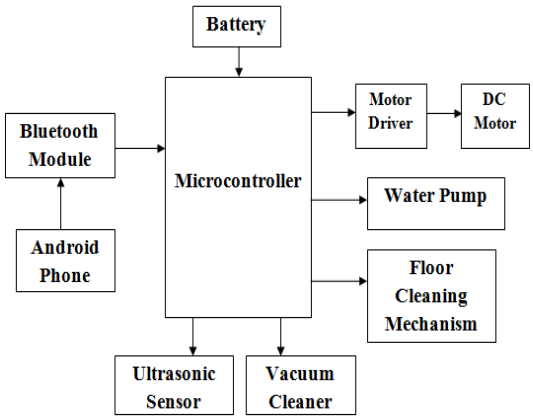

Figure 1: Block Diagram

IV. COMPONETS USED

1) Arduino Uno: Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It can connect to a computer with a USB cable or one can power it with an AC-to-DC adapter or battery.

2) HC-05 Bluetooth Module: Range is approximately 10meters (30 feet). It uses wireless technology standard for exchanging data over sort distances (2.4 to 4.485 GHz) from fixed and mobile devices, and building personal area networks (PANs). It can be powered from 5V power.

3) HC-SR04 Ultrasonic Sensor: It provides 2cm to 400cm non contact measurement function. The ranging accuracy can reach to 3mm and effectual angle is less than 15 degrees. It can be powered from 5V power.

4) L298N Motor Driver Module:
Double H-bridge drive chip
Logical Voltage: 5V
Drive Voltage: 5-35V
Logical Current: 0-36mA
Drive Current: 2A
Maximum Power: 25W

5) Battery: A rechargeable battery is a type of electrical battery which can be charged, discharged into a load, and recharged many times, as opposed to a disposable battery which is supplied fully charged and discarded after use. It is composed of one or more electrochemical cells. Accumulator stores energy through a reversible electrochemical reaction.

V. METHODOLOGY

The robot is designed to do dry and wet cleaning. Vacuum Cleaner is used to do dry cleaning. Wet cleaning is done with the help of two wiping pads. Water required for wet cleaning is dropped from the water pump. Both vacuum cleaning and wiping is done simultaneously. The robot works in two modes Manual and Automatic as per the user's convenience. In Manual mode connection is established between Bluetooth Module and Bluetooth Chat Application to control the robot's movements. After user types and sends the command the robot will perform the task accordingly. In Automatic mode the robot is designed to move automatically throughout the room, obstacle detection is done with the help of ultrasonic sensor.

VI. RESULTS

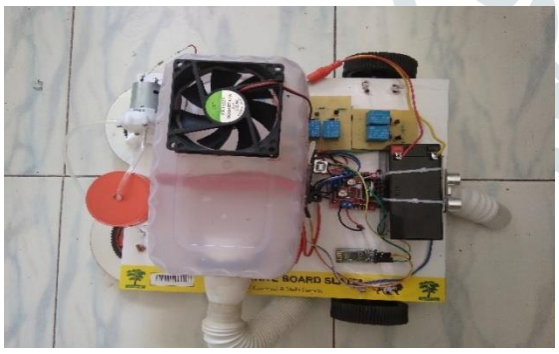

Figure 2: Internal Structure of Robot

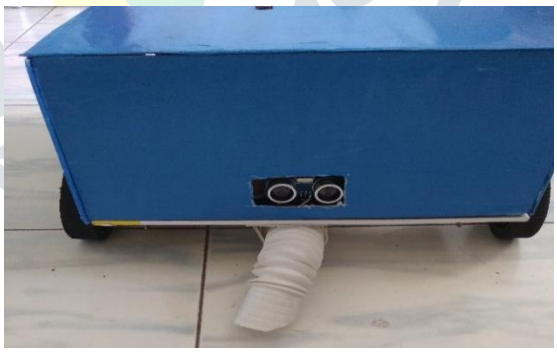

Figure3: Robot with enclosure.

VII.ADVANTAGES

1) Cost Effective
2) Easy to use
3) Reduces human efforts
4) Light Weight
5) Small size

VIII.FUTURE SCOPE

1) Image of room to be cleaned can be fed to the controller so that the robot can clean the entire room according to the input fed.
2) Automatic Charging can be added.

IX.CONCLUSION

The project proposed here is 'Smart Floor Cleaning Robot'. It performs two functions: dry cleaning and wet cleaning. It works in two modes: manual mode and automatic mode as per the user's convenience. The project reduces human efforts as well as time required to do cleaning. As this is a prototype many other features can be added.

X.REFRENCES

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