

ROBOTIC VACCUM CLEANER

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Abstract- Cleaning is important work in every place of our house. Sometimes this is easy and sometimes it is difficult. Sometimes we assigned people for the purpose of cleaning and pay money for them. But sometimes cleaning is required in areas where presence of living being dangerous so we cannot assigned living being. So we required some technique to compensate these problems. We make a Robotic vacuum cleaner as a vacuum cleaner, which is operated using dual mode that is automatically and manually. In Automatic mode the robotic vacuum cleaner will cause the robot to move randomly on the floor of a room by avoiding the obstacles in front of the robot by using ultrasonic sensor (HC-SR04). In manual mode the robotic vacuum cleaner moves following commands that are controlled by the android-based smartphone using the Bluetooth module (HC-05). Vacuum cleaner robot is designed to make cleaning process become easier rather than by the using manual vacuum.

KEYWORDS: Arduino UNO, Ultra Sonic sensor, Bluetooth HC-05 Module, Portable suction motor, Geared motors, 3 pin slide switch.

I. INTRODUCTION

In the current busy lifestyle, cleaning houses and surroundings has become more difficult. To make life easier, high-performance machines are in demand. The project aims to design and implement a dual-mode robot vacuum cleaner that can clean floors automatically or manually. The robotic vacuum cleaners have replaced the traditional style of cleaning with the use of machines. The research and development of an autonomous mobile robot and a Manual Phone Application Control prototype able to vacuum cleaning a room or even an entire house. The prototype robot vacuum cleaner, was designed using Arduino Uno as the control center, has a Ultrasonic sensor input, Bluetooth HC-05 module and an output in the form of a DC Motor Driver IC L293d to regulate the robot's movements. In automatic and manual vacuum "cleaning robot" is very simple technique and easy to operate any persons. The size of the machine is also portable, so we can transfer from one place to other place very easily.

II. LITERATURE SURVEY

In olden days, the vacuum cleaners has been moved automatically using an accelerometer sensor to facilitate the direction of movement. The condition of the floor with some furniture objects that fill the room is also a problem in designing cleaning tools for the room. The main problem is most of the people are working and they didn't have

enough time to clean floor. From time to time technology come up and need to upgrade for easier human task.

Mohd. Shahbaz Khan et al "Bluetooth control cleaning robot using Arduino". They have designed a robot and the robot is controlled using Bluetooth which is present at both transmitter and receiver end [1]. Vijayalakshmi M et al proposed "Smart Vacuum Robot" with progressive technology. S-curve planning is used for efficient working along with sensors to avoid obstacles [2]. Gaurav Dhariwal et al have proposed "Development of Driverless RC Car". In this paper, an automatic car is built using concept of neural networks. This detects the obstacles present using sensors. Arduino and Raspberry Pi is used in this model [3]. S Yatomono et al proposed a paper on "Development of Intelligent floor cleaning Robot". They have developed a smart floor cleaning Robot that can clean the place by navigating, sucking the dust and polishing the floor. The robot consists of an omni wheel which is equipped with a vacuum cleaner and floor polishing motor. It is coded in Arduino IDE by using Arduino microcontroller and it is equipped with Bluetooth so that it can work from smart phone connected via Bluetooth [4]. Sabir Hossain et al proposed "Deep Reinforcement Learning-based ROS-Controlled RC Car for Autonomous Path Exploration in the Unknown Environment". In this paper, LiDAR equipped car using the concept of deep learning is discussed. The software used here is ROS and Arduino.

III. EXESTING SYSTEM

In existing vacuum cleaners are require the man power to direct the movement of the vaccum cleaner on the floor. The main problem is most of the people working and they don't have enough time to clean their houses. The condition of floor with full of furniture is a heavy task to cleaning the floor. Also vacuum cleaners used to clean the surroundings which are very noisy. Ans also old vacuum cleaners increase the electricity bill, hoovers use powerful motors to create suction andrequire electricity bill.

IV. PROPOSED SYSTEM

Our system object is to design automatic floor cleaning robot. To design a autonomous cleaning robot without the human interaction in between of cleaning.it is mainly used in when obstacles are less in a large room. For example a large room is needed to be clean then it requires so much of human effort. In that case our Roboticvacuum cleaner is to be used. I n areas like nuclear power plants and chemical factories can make a man sick or death then that case the robotic vacuum cleaner takes place to be cleaning purpose.

The block diagram of the proposed model. Here, Motor Driver Shield is placed on top of Arduino Uno. In the front of the prototype, Ultrasonic sensor is attached which measures the distance. Towards the back of the car, vacuum cleaner is placed. The vacuum cleaner holds the Suction motor. The wheels, DC Motor and batteries placement is as shown below.

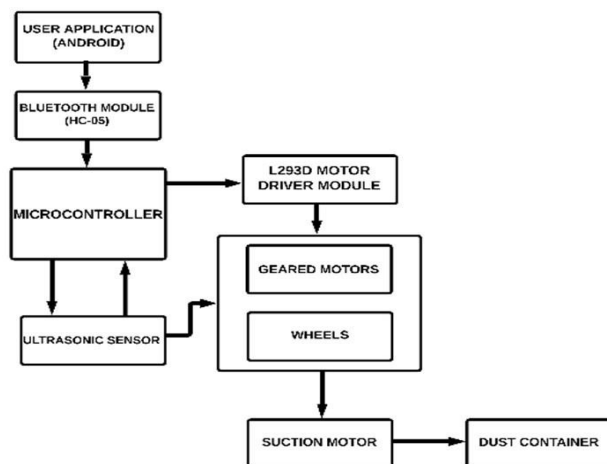


Figure.1: Block diagram of proposed system

V. SOFTWARE

For developing the project,we maily used the software is Arduino IDE 1.8.19.

The Arduino IDE is an open-source software, which is used to write and upload code to the Arduino boards. The IDE application is suitable for different operating systems such as Windows, Mac OS X, and Linux. It supports the programming languages C and C++.

VI. METHODOLOGY

The main objective of this project the robotic vacuum cleaner is used to clean in a easier way in both manual mode and automatic mode.

We design this robotic vacuum cleaner in dual mode i.e manual mode which is using through HC-05 bluetooth module and the Bluetooth module configured to the mobile application which is installed on user mobile phone from the webstore.And automatic which can senses from the front and side obstacles through the ultrasonic sensors SR04,And the L293D motor driver module is used to drive the motors like geared motors and DC motors.

ADVANTAGES

- Cleans without human interference.
- Robotic vacuum cleaner are convenientand saves time.
- It is good at detecting boundaries.
- Robotic vacuum cleaner cheap to Maintain in India.
- Can clean underneath of furniture.
- You can clean your home when you are away from home.
- Compared to traditional vacuums, robotic vacuums are much quieter.
- Using mobile application as a remote- control device, you can control the robotmuch easier, and no extra manual operation is needed.
- Robotic vacuum cleaners are easy to store and easy to carry.
- Robotic vacuum cleaners are economical and cost-efficient.

APPLICATIONS

- Cleaning (vacuum cleaning, floor cleaning, lawn mowing, pool cleaning and window cleaning)
- Entertainment (toys and hobby robots)
- Domestic security and surveillance (machine vision, motion detection, more)

VII. EXPERIMENTAL RESULTS



Figure.2:Final project



Figure.3: before cleaning the floor

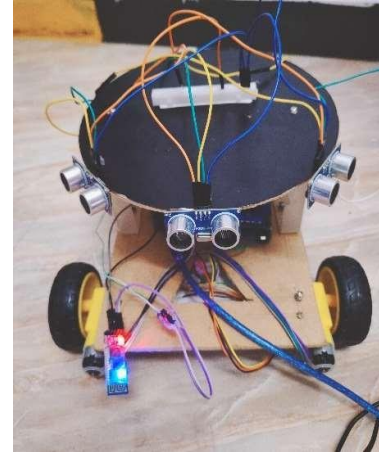


Figure.4: After cleaning is done

VIII. CONCLUSION

The robotic vacuum cleaner is able to clean the floor using dual mode that is automatically and manually connected to the application on Android smartphone. The vacuum cleaner is able to suck in the form of tissue and paper with a maximum size of 1cm*1cm, beyond that size the vacuum cleaner cant suck up to the maximum. This research facilitates efficient floor cleaning with sweeping and mopping operations. This robot works in two modes automatic and manual for user convenience. This proposed work provides the hurdle detection in case of any obstacle that comes in its way.

IX. FUTURE SCOPE

Now we are working to make a fully automatic vacuum cleaner. The robot smart enough it can detects all the objects in the room and it will easily cleans the room withavoiding the objects around the vacuum cleaner. When the robot cleans any room the vacuum cleaner will save the information about the obstacle and its location and if the user ants to clean the room the it will restorethe information and will clean faster.

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