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# Autonomous Cleaning Robot

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*Abstract: The autonomous cleaning robot identifies snags and controls its course according to the sources of info it gets from ultrasonic sensors mounted in front. The system is a controlled by a microcontroller. It is modified to acknowledge contributions to detect deterrents before it and control the robot to stay away from any crashes. If there should arise an occurrence of an obstruction comes in the microcontroller controls the wheels of the robot by an engine driver to keep away from obstacle. The vacuum cleaner mounted on the robot plays out the swiping work. The motors mounted in front side of the robot uses cleaning cloth to clean the surface and CPU cooling fans to dry the surface. The microcontroller is customized such that it takes the choice and changes the way of the robot according to the sensor contributions to maintain a strategic distance from the obstacle.*
*Keywords: Microcontroller, Motor Driver, Ultrasonic Sensor, Vacuum Unit, cleaning*

## I. INTRODUCTION

These days all over, the Automatic Cleaning Robot is required. Thusly, the cleaner is laid out with the end goal that it is prepared for cleaning the area in like manner ousting the clean decreasing the human effort just by starting the cleaning unit. The primary concentration is to fabricate and program it in such a way, that it can move around openly and clean a particular zone by the vacuuming procedure and clean the floor all the while. Vacuum is joined next to its so as to gather the tidy while moving and cleaning material is connect at the front to clean the floor. The cooling fan is joined to the rear of the robot to dry the surface when cleaning is finished. It utilizes Ultrasonic sensors to identify the snags and thus alter its course while moving. Vacuum cleaning framework utilized as a part of this robot is Cyclonic compose filtration framework which works under the rule of constrained vortex stream same as in the event of the diffusive pump. Diffusive power will be made and a wide range of flotsam and jetsam will be sucked in through a pipe. The upside of utilizing this robot will spares time. It is a basic and minimal effort robot.

## II. LITERATURE SURVEY

| Sr. No. | Author | Name | Publishing Details | Working |
|---|---|---|---|---|
| 1. | Manya Jain, Pankaj Singh Rawat, Assist. Prof. Jyoti Morbale | Automatic Floor Cleaner | Vol: 4, Issue: 4\| Apr-2017 IRJET ISSN: 2395-0056 | The programmed floor cleaner is shrewdly customized to clean a particular region through a vacuum cleaning get together. Sensors are fundamentally used to set up a correspondence interface between the outside world and the computerized gadget and to satisfy the reason utilize two Ultrasonic Sensors (HC-SR04) are consolidated in the task. One of it is utilized to identify the impediments or obstacles before the cleaner so it moves back and change its way or path and the other is utilized to distinguish the stature keeping in mind the end goal to keep the cleaner from tumbling down. A self-form suction unit is joined to the brushless DC engine turning at a fast. It suck in the earth when it is turned on. It can be confined and the soil can be expelled from it.[5] |
| 2. | Karthick T, Ravikumar A, Selvakumar L, Viknesh T, Prathibhan | Simple Autonomous Cleaner Robot | Vol: 4, Issue: 5\| May-2015 IJSETR ISSN: 2278-7798 | The strategy being utilized as a part of this proposed independent cleaner robot to accomplish the goal of cleaning the floor with less power utilization. Irregular cleaning is being utilized as a part of this robot for the proficient cleaning process This cleaning technique does not require a specific incentive for the cleaning design. The robot moves forward way until the point when a deterrent is detected and afterward it turns if there is any snag before |

| | | | | |
|---|---|---|---|---|
| | B, Gopinath A | | | it. Next, it moves concurring the program being actualized. In this method both the motion motor will run at fixed speed which is slightly slower than the normal speed and Vacuum motor speed will be higher. Random cleaning can be expressed with the help of single sensors or multiple sensors..[3] |
| 3. | Abhishek Pandey, Anirudh Kaushik, Amit Kumar Jha, Girish Kapse | A Technological Survey on Autonomous Home Cleaning Robots | Vol: 4, Issue: 4| Apr-2014 IJSRP ISSN: 2250-3153 | All Roomba models can be worked by physically conveying them to the space to be cleaned and squeezing the suitable catch. Later models presented a few new working modes. "Clean" mode is the ordinary cleaning program, beginning in a winding and afterward following a divider, until the point when the room is resolved to be perfect. "Spot" mode cleans a little zone, utilizing an outward-then-internal winding. "Max" runs the standard cleaning calculation until the point when the battery is exhausted. "Dock" mode, presented with the third era, teaches the robot to look for a self-charging homebased for reviving. The accessibility of the modes shifts relying upon demonstrate, by and large with higher-end units having more highlights. [1] |

### III. SYSTEM ARCHITECTURE
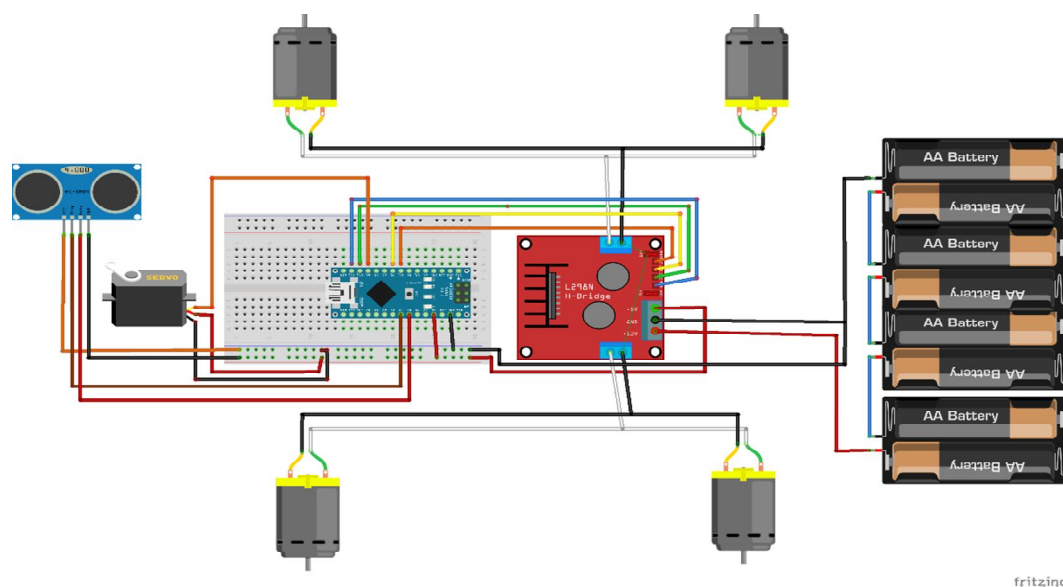


Fig-1: architecture diagram of Automatic Floor Cleaner.

Microcontroller (Arduino UNO) is used and DC motors associated with motor drivers to perform motion, it is presented with a sensor and suction unit to perform vacuum action. For Power Supply two separate batteries are used. One is used to turn on the cleaning unit and other is used to offer vitality to the suction unit.

Vacuum cleaner mounted on top will gather the tidy. The motor mounted on front side of the robot with cleaning cloth which also use some amount of water supply to clean. The CPU cooling fan is mounted on backside of the robot to dry the surface after cleaning.

### A. Working

To program the Arduino the Arduino IDE is used which is free software that enables programming in the language that the Arduino understands. In the case of the Arduino, the language is based on C/C++ and can even be extended through C++ libraries. The IDE enables writing a computer program which is a set of step-by-step instructions that is then uploaded to the Arduino. Arduino will then carryout those instructions and interact with whatever it has been connected to it. In the Arduino world, programs are known as "sketches".

Table -1: Software and Hardware Specifications

| SR. No. | Requirement | Specification |
|---|---|---|
| 1. | Battery Life | 2 hours |
| 2. | Vacuum | At least 90% |
| 3. | Store dust | Maximum 20 cm3 storage |
| 4. | Weight | Max 3 kg |
| 5. | Cleaning Time | Depends upon area |
| 6. | Software | Arduino ide |
| 7. | Cooling fan | Make surface dry instantly |

*B. Methodology*

*1) Zig-Zag ALGORITHM*

Zig-Zag filling ways cover the territory beginning from the one end of the room and consummation towards another end. In figure 6.3.1 a normal zig design has appeared. In for all intents and purposes each condition a solitary crisscross can't cover the whole region and in this manner appropriate way calculation ought to be planned, requiring a strategy like backtracking to guarantee finish scope. In the calculation is enhanced to likewise deal with the covering of cells inside this lattice that are mostly secured by an obstacle.
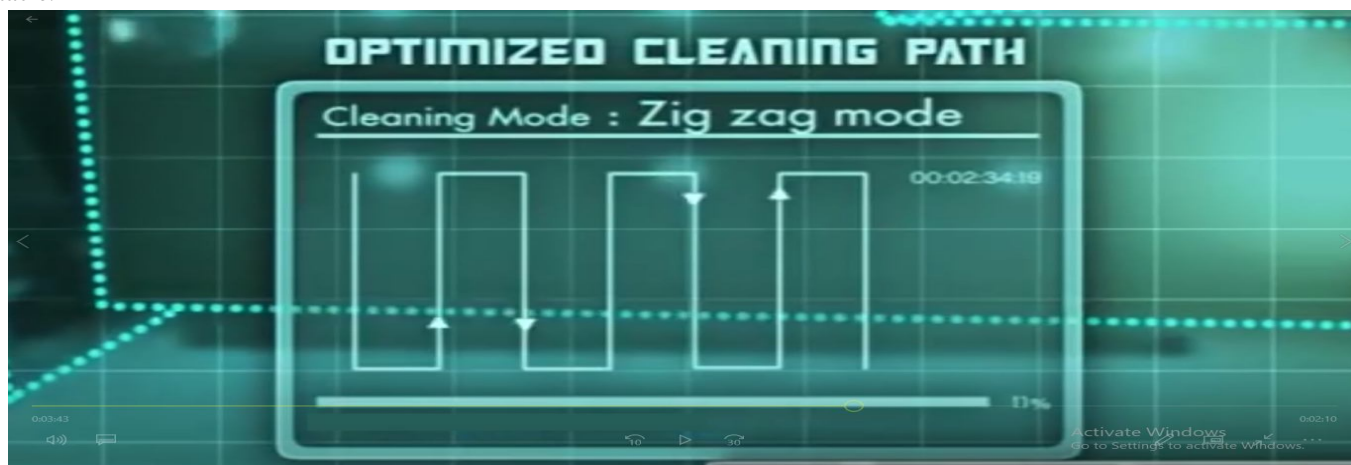


3.1: Zig-Zag algorithm of movement

The robot has a crisscross shape and has a settled most extreme speed. The robot is fit for moving in straight lines and can turn while remaining at a similar area for the privilege or left turn. Since a portion of the current haphazardly moving cleaning robots likewise meet these particulars, the innovation for making such a robot is promptly accessible.

Bot begins cleaning from one end of the room and goes around the space to achieve another end. When it hit an obstruction it trusts that it achieved a divider than it chooses whether to take a privilege or left turn and after that it turns right or left after the calculation. When it hits a hindrance, it trusts it has achieved the border of the room. It at that point cleans along the way until the point that it reaches another stopping point, and soon thereafter it cleans around it, finds an unmistakable way and continues to navigate the room between objects like dividers and furniture until the point when another finish of room came to. The thought gives off an impression of being that if there is no immediate impediment between the way then it will clean more productively, yet whether it really accomplishes finish floor scope is basically all in or all out.

## IV. RESULT

A. *The analysis of Proposed Project Infers That it Will Provide*
1) Saving time and energy.
2) User will have to worry less about cleaning.
3) Automating the process of cleaning with minimum human efforts.
4) The floor should be clean after sweeping.
5) The floor should be clean after Robot has done cleaning work.

## V. CONCLUSIONS

This examination encourages productive floor cleaning. Since in venture the floor cleaner is joined with the vacuum cleaner, so it will be anything but difficult to deal with it likewise spares time and will work naturally to clean reason at homes.

With basic calculation and program, the cleaner will have the capacity to cover vast floor regions and in addition, discover its way into and out of little corners all the more effective. As the cleaner crosses the room, the sweeper introduced in it will figure out how to get a lot of soil. Manual cleaning will get obsolete in same days and these self-ruling cleaners will clean the house for us.

## VI. ACKNOWLEDGMENT

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