

# Design and Fabrication of Wireless Vacuum Cleaner

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## ABSTRACT

*In this project the proposal concept is to replace the manual work in cleaning by automated system. A vacuum cleaner is a device that uses an air pump to create a partial vacuum to suck of dirt and dust particles from a given surface. vacuum cleaners are used as homes as well as industries and comes with a variety of power levels, small battery operated hand held devices, domestic central vacuum cleaners and huge stationary industrial appliances. universal motor is typically used suction motor across vacuum cleaner. the universal motor is a series DC motor that is specially designed to operate on alternating current (AC) as well as on direct current (DC). The major OMEs (original equipment manufactures) are in consider alternative motor types to over come those disadvantages. This application consider the use of BLDC motor for vacuum cleaner application with good performance benefit. The vacuum cleaner absorbed the dust. The dust free place is cleaned by the water. The vacuum clear and floor cleaner direction is controlled by wifi.*

**Keywords:** Microcontroller, Water tank, Mobile (wifi), Suction Unit, Vacuum Unit.

## INTRODUCTION

Robots are utilized for many applications to assist Human Beings. The conventional vacuum cleaner system consists of large mechanical and electrical parts which are more costly and incur

more losses. It works only on AC which consumes more power around 1000W and we cannot use it during power outage period. The autonomous cleaner robot consist of low power consuming electronic and mechanical parts and it can operate during power outage period and does not need any human guidance. By using this proposed autonomous cleaner robot operating cost and initial cost of the machine will be reduced and the human effort and time will be saved. Robots have electrical components which power and control the machinery. That power comes in the form of electricity, which will originate from a battery, a basic electrical circuit plays a vital role here. The electrical aspect of robots is used for movement through motors. Sensing is where electrical signals are used to measure things like heat, sound, position, and energy status.

Thus robots need some level of electrical energy supplied to their motors and sensors in order to activate and perform basic operations. Robots all have some kind of mechanical construction, a frame or shape designed to achieve a particular task. The mechanical aspect is mostly the creator's solution to completing the assigned task and dealing with the physics of the environment around it.

**Floor cleaner** is very much useful in cleaning floors in hospitals, houses, auditorium, shops, computer centers etc; it is very simple in construction and easy to operate Anybody can operate this machine easily. It consist of moisture cotton brush, the brush cleans the floor

and dried with aid of small blower. Hence it is very useful in hospitals, houses, etc. The time taken for cleaning is very less and the cost is also very less. Maintenance cost is less.

## PROBLEM STATEMENT

In today's era automation plays a very important role in all industrial applications for the proper disposal of sewage from industries and household is still a challenging task.

### “Automatic Vacuum Cleaning System”.

Whether you have wood floors, tile floors, or carpet, the truth is that your floor surfaces will get dirty and cleaning them simply isn't a lot of fun. It's a job that is seemingly never finished and even if you clean them once a week, you will still find debris, dust, dander, and hair on their surfaces. This frustration with cleaning floor surfaces is one of the reasons why an automatic vacuum cleaner was finally developed. Our project basically consist of three major parts: a robot chassis with robotic arm, remote controller and vacuum cleaner. The microcontroller is programmed to control the various operation of the robot. In remote controlled mode it works with two major units, one is transmitter and other one is receiver. These two units communicate with each other via radio waves.

## LITRETURE REVIEW

[1] Umankhalid In earlier days the floor is cleaned by help of manpower. Then after few year the floor cleaning device is implemented. That device is operated by robot. [6] Satyinder Singh Before cleaned the floor the dust particles are removed by help of manpower. Then After few years the vacuum

cleaner is implemented and that device operated by robotics. In our project the combination of vacuum cleaner and floor cleaner. The vacuum cleaner and floor cleaner is run by battery power. The device direction is controlled by wifi.

## PROCESS OF VACUUM CLEANING SYSTEM

The robot is designed keeping in mind following modules of operation.

- i. cleaning mechanism
- ii. directional control with automatic obstacle avoidance
- iii. In time monitoring The cleaning is inspired from the conventional stages of any wiping or sweeping operation, which are blend with the design and placed in the operational order of working stages. It consist of four dedicated wipers that are attached to the platform. Among them, one of the wipers is cylindrical and the others are flat in geometry.



## RESULTS AND DISCUSSIONS

### A. PERFORMANCE ANALYSIS

We had evaluated main three tasks

- 1) Cleaning time
- 2) Obstacle detection
- 3) Calibration

1) Cleaning time The path followed by the robot is in “S” shape, and it gives best result for cleaning cycle with less time. The average speed of the robot was 0.60 m<sup>2</sup> per second. The proposed system is capable of cleaning 3.85m × 2.67m room within 874.15 sec or 15 Min.

2) Obstacle detection Due to the limitations of ultrasonic sensor, there are possibilities for minute errors, but it is negligible and comfortable for the operation of robot. Similarly, S shape path make it smooth cleaning without any leftover space other than the obstacle area.

3) Calibration Most difficult task while doing the project was the calibration process. The major shortcoming of the system was the varying calibration according to the various terrain in which the system is placed. Calibration is done based on the angle of rotation of the wheel by keeping a wheel stationary, i.e., 180 degree.

### ADVANTAGES

- Cost of production is low.
- Time and Energy are saved
- Ideal for people with mobility issues
- Advanced features
- Minimum maintenance
- No need to purchase heavy machinery.
- Working principle is quiet easy.
- Compact and High efficient.

### APPLICATIONS

- It can be utilized to separate plastic, thermo cool, iron piece from sewage.
- It can be utilized as a part of plastic businesses.

This machine is mainly used in cleaning system.

### CONCLUSION AND FUTURE SCOPE

Thus the proposed Autonomous cleaner robot consists of DC battery which can be charged with in a hour and can be used during power outage period. It has a vacuum cleaning system which consumes very less power on comparing with existing system. The existing system consumes very high power of around 500W for suction whereas autonomous cleaning system only requires 10W for suction. So power consumption will reduced greatly and hence the operating cost is also very low.

The additional features that may be added in autonomous cleaner robot are GPS control system using mobile phones for cleaning process. The control is also enhanced by controlling the robot by Bluetooth or zigbee. And by implementing solar panel in the robot we can charge the battery using light energy which can enhance the robot to operate in power failure condition. By implementing the fuzzy logic in the autonomous cleaner robot we can enable artificial intelligence in cleaning.

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