

# Smart Vacuum Cleaner with Insects & Germ Repellent

Anandhu.S.Nair<sup>1</sup> Gowtham.S<sup>2</sup> Ailan.R<sup>3</sup> Palani.R<sup>4</sup>

<sup>1,2,3,4</sup>Department of Mechanical Engineering

<sup>1,2,3,4</sup>VEL Tech High Tech Dr.Rangarajan And Dr.Sakunthala Engineering College, India

**Abstract** — With today's busy schedule, cleaning your home and surroundings is even more difficult. Currently, there are vacuum cleaners that require a human to operate. Therefore, it is highly desirable to provide a vacuum cleaner which can operate without human intervention. This project implements an effective method of cleaning the desired area. By using this vacuum cleaner, dangerous places can be cleaned, reducing the risk to humans. This is achieved by implementing an autonomous system. Here, an RC motor built into a vacuum cleaner is used. The system comes with an ultrasonic sensor that helps avoid large obstacles like tables, chairs, walls, etc. With the current COVID situation, more and more people cannot clean together due to the need to maintain social distancing. In the era of more and more advanced digital technology, the distance is measured by this sensor, and the car will choose the farthest direction from the obstacle to avoid the collision with the obstacle. The vacuum cleaner is designed with a CPU fan and a hose is attached to the mouth of the bottle. The entire system is powered by batteries. With today's busy schedule, cleaning your home and surroundings is even more difficult. Currently, there are vacuum cleaners that require a human to operate. Therefore, it is highly desirable to provide a vacuum cleaner which can operate without human intervention. This project implements an effective method of cleaning the desired area. By using this vacuum cleaner, dangerous places can be cleaned, reducing the risk to humans. This is achieved by implementing an autonomous system. Here, an RC motor built into a vacuum cleaner is used. The system comes with an ultrasonic sensor that helps avoid large obstacles like tables, chairs, walls, etc. With the current COVID situation, more and more people cannot clean together due to the need to maintain social distancing. In the era of more and more advanced digital technology, the distance is measured by this sensor, and the car will choose the farthest direction from the obstacle to avoid the collision with the obstacle. The vacuum cleaner is designed with a CPU fan and a hose is attached to the mouth of the bottle. The entire system is powered by batteries.

**Keywords:** Smart Vacuum Cleaner

## I. INTRODUCTION

Cleaning the environment around us is one of the important responsibilities of every human being. The larger the area to be cleaned, the more people will be needed. Some places can get dirty and cleaning them can have a big impact on health. Due to the dust in the environment, people are prone to symptoms such as allergies, tears, colds, coughs and rashes. Vacuum cleaners can be used for household purposes such as cleaning floors, cars, carpets, etc. As the space is also large, it can be used effectively in universities. With the current COVID situation, more and more people cannot clean together due to the need to maintain social distancing. In this era of rapid development of digital technology, human beings are increasingly dependent on it. Since most people are in the labor force, time is always running out. Since the Arduino can

be programmed to cover a specific area, the vacuum moves in the desired direction for as long as the motor carrying it can. The Swachh Bharat Mission is an initiative of the Indian government in 2014 to keep the environment clean. The main objective of this mission is to prioritize everyone's cleansing, as it has a great impact on the health of each organism. It has been implemented in both rural and urban areas. Currently, there are handheld vacuum cleaners on the market. Automation is still in its infancy and smart vacuum cleaners will be a major breakthrough for the industry. In this project, an automatic vacuum cleaner is designed. It consists of a remote-controlled car with an attached vacuum cleaner. Ultrasonic sensors are installed in the front of the car to measure the distance when an obstacle is detected. In the event of an obstacle, the car changes course according to the code. Robotic systems for autonomous vacuum cleaners that allow automatic cleaning of specific areas or rooms by analyzing the coverage area using limits. The robotic system covers the entire room along a zigzag path. The system uses ultrasonic sensors for boundary detection and covers the entire room accordingly. The system also has a vacuum on the back for vacuuming. It also shows the time it took to complete the cleaning session and displays it on the LCD screen after the cleaning process. The system uses microcontroller-based circuitry to monitor the ultrasonic sensor while operating the LCD display and controlling robot movement. The system detects a corner of the room and starts from there, then activates the vacuum motor to activate the vacuum system. Once it reaches a corner, the robot spins, working in a zigzag pattern. It automatically covers the whole area. For this system to work properly, there must be no obstacles in the room. This issue may be resolved in future system enhancements. The system now also displays on the LCD screen how long it takes to complete a full cleaning. The vacuum cleaner consists of a battery-operated CPU fan. A tube is attached to the front of the vacuum cleaner to suck up dust from the floor. The vacuum cleaner has a space to collect dust. Once full, it should be removed and cleaned by hand. The vacuum will ride on a remote control car and the direction of the wheels depends on the code uploaded to the Arduino.

## II. ADVANTAGES

Robotic vacuum cleaners are handy and save time. One of the vacuum cleaner's main qualities is that it saves time and effort to clean your floor. If it is a manual vacuum cleaner, you will have to clean it yourself. Once you set it up and turn it on, it will finish the rest of the job, allowing you to focus on other important tasks or even relax by reading your favourite magazine or watching an interesting movie.

Once you set it up and turn it on, it will do the remainder of the work, allowing you to focus on other vital tasks or simply relax by reading your favourite magazine or watching an intriguing movie.

- Robotic vacuum cleaner is inexpensive to maintain in India. Once you've removed all dust particles from your robotic vacuum cleaner and thoroughly cleaned it, it requires very little maintenance. It will endure as long as you maintain it properly.
- It will endure a long time without requiring extensive maintenance. Some types will even recharge themselves after the vacuuming is finished. As a result, even if you forget to charge your robotic vacuum cleaner, it will do it for you.
- Time savings: the day is never long enough, so why waste it pulling a vacuum cleaner around? A robot vacuum cleaner relieves you of this time-consuming activity, allowing you to devote it to other significant activities.
- Allergen reduction: Allergies can have a significant impact on your quality of life. The pollen load in your house will be greatly decreased if you use a robot vacuum cleaner on a regular basis, and allergies will be kept at bay. Those who are very sensitive

### III. DISADVANTAGES

- It must be well cleaned before use. A robotic vacuum cleaner won't know when to pass over something and when to pick it up, unlike a human vacuum cleaner. As a result, there is a significant likelihood that your new robot friend may try to destroy whatever Legos or hamsters that are on your floor in order to maintain cleanliness. Therefore, you must perform a pre-vacuum pickup around the house if you want to prevent breaking your vacuum.
- Replacing components might be expensive. While most models do come with some form of guarantee, it's common for them to exclude wear and tear from frequent usage. It can be highly expensive to fix a wornout or damaged robotic cleaning device.
- The amount of money you spend can have a big impact on cleanliness. In nearly all situations, the cliché "you get what you pay for" appears to apply, and robotic vacuum cleaners are no exception. In general, a low cost machine won't produce the same outcomes as a more expensive one. Therefore, do not be scared to spend a little money if you are genuinely serious about utilising a robotic vacuum cleaner.
- Doesn't produce the same outcomes as a manual clean. If you've done any type of research on robotic vacuum cleaners, you've undoubtedly already read or seen a tonne of reviews on how effective the machine is at cleaning,

### IV. STRUCTURE OF VACUUM CLEANER

1.25L water bottle, CPU fan, pipe, tape, gauze bandage, batteries, and switch make up a vacuum cleaner. The vacuum cleaner is displayed. Below is a description on how to design the same. How to build a vacuum cleaner: Cut a 1.25 litre water bottle in half horizontally. Conical and cylindrical shapes are present at the top section, with the conical shape being sliced. As seen in the picture, a pipe connects the bottle cap portion of the assembly. The pipe's diameter is 1.5 cm, and its length is 45 cm. A gauze bandage is placed over the

opposite end of the conical construction to increase the vacuum. In this step, the cylindrical and conical pieces that were separated in step ii are taped together.

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