Path Finding Smart Vacuum Cleaner Robot

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Abstract— Cleaning homes and the surrounding area is increasingly difficult with the busy routine of today. There are currently vacuums that need to be operated by people. Vacuum cleaners that operate without the requirement for human intervention are therefore desperately needed. This project has created an effective way to clean the desired region. This hoover cleaner can be used to clean dangerous areas, lowering the risks to people. By putting an autonomous system into place, this is accomplished. The primary goal of this project is to design and build a vacuum robot prototype. To this end, a motor with wheels, an ARDUINO UNO, a motor shield, and an ultrasonic sensor will be used. The robot's distance from the obstruction is determined by the ultrasonic sensor. Twelve volt batteries are used to power the entire circuit. A hoover robot will possess multiple user friendly characteristics.

Keywords— ARDUINO UNO

I. INTRODUCTION

An ARDUINO-based vacuum cleaner is one that utilizes an Arduino microcontroller for operation. The ARDUINO board's programming controls the motors, sensors, and other components of the vacuum clean Programming on the ARDUINO board controls the motors, sensors, and other components of the vacuum cleaner. This means that during the cleaning process, the hoover cleaner can be fully customized and regulated. It may be configured to clean specific regions, have its suction force changed, and even maneuver around obstacles. Additionally, an ARDUINO-based vacuum cleaner can provide remote control and monitoring capabilities by integrating with other devices and frameworks, such a smartphone or home automation system. This is why the hoover cleaner serves as both a practical cleaningtool and a fun and educational project for makers and enthusiasts who are passionate about robotics and home automation.

Figure 1: Overview of the Smart Vacuum Cleaner

II. OBJECTIVES

- To automatically detect and avoid obstacles is the main goal of the project. The purpose of the vacuum is to gather the dust particles.
- To show the battery's remaining capacity. 4. To use an app to operate the robot.

III. LITERATURE SURVEY

Title And Author	Technique and Description
A Irawan, Yuda, Muhardi, Muhardi,Ordila, Rian, AND Diandra, Roni. "Automatic FloorCleaning Robot Using Arduino and Ultrasonic Sensor" Journal ofRobotics and Control (JRC). (July 2021)	This paper discusses about information regarding several parts, namely of an Ultrasonic Sensor, Motor Shield L298, Arduino Uno microcontroller, Servo, and Dc Motor. This tool works when the Arduino Uno microcontroller processes the ultrasonic sensor as a distance detector and a DC motor as a robot driver, then the DC motor
Design and Manufacturing of Automatic Classroom Vacuum Cleaning Robot"by Aniket A Somwanshi; Sanjay B Matekar . Publisher - InternationalJournal of Engineering Research & Technology	Robot an electromechanical device automates the work process in many areas like industrial power plants, military applications, domestic work, agricultural
Design and Development of Automatic Cleaning and Mopping Robot" by P.S. Aditya; R. Tejas; V. Sai Varun; B. N. Prashanth. IOP Conference	This paper reports "how to minimize the cost of your robot". The design procedure for creating the cleaning robot is what they have discussed at the starting
Vision-Based Dirt Detection and AdaptiveTiling Scheme for Selective Area Coverage" by Balakrishnan Ramalingam; Prabakaran Veerajagadheswar; Muhammad Ilyas;Mohan Rajesh	This paper discusses about information regarding visual dirt detection algorithm and an adaptive tilingbased area coverage scheme for reconfigurable morphology robot

IV. ADVANTAGES

Precise Mapping: The robot vacuum's LiDAR sensors detect the time it takes for light to refract after colliding with items in your house by emitting laser pulses. This makes it possible for the vacuum to draw a very precise and thorough floor layout of your house. An effective cleaning procedure is ensured by the LiDAR system's accurate measurements, which produce a trustworthy depiction of the layout.

Improved Navigation: The robot vacuum with LiDAR technology can navigate your house with remarkable accuracy thanks to a learned floor plan. It cleverly plans its cleaning route using the mapping environment to prevent needless overlap or area missing. The vacuum can identify

furniture, barriers, and other possible impediments thanks to the LiDAR data, allowing for easy and obstacle-free mobility throughout your house.

Obstacle Avoidance: Using LiDAR technology, the mapping robot vacuum is able to prevent items from colliding with it in real time. The vacuum can precisely detect and identify barriers by constantly scanning and sensing its surrounds. This guarantees careful maneuvering around walls, furniture, and other objects without causing any harm.

Effective Cleaning Patterns: The robot vacuum can tailor its cleaning patterns based on the floor plan it has learned, all thanks to LiDAR's spatial awareness. With its clever zone division capabilities, it can effectively and methodically clean every area of your house. Because the vacuum is aware of the precise areas that need to be cleaned, cleaning sessions become quicker and more comprehensive as a result.

V. DISADVANTAGES

- Volume of Noise
- Room for Storage
- Power Requirement
- Financial Aspects

VI. APPLICATIONS

- They are mostly used to clean dust and debris out of upholstery, carpets, velvety furniture, hardwood floors, and a variety of other types of flooring,
- Including laminate floors. Cars and stairs are also cleaned with them.

Vacuum Cleaners are classified into many categories based on their intended applications.

CONCLUSION

Less time spent on household chores. Although Vacuum Cleaners have made cleaning the house easier, they are occasionally too heavy and noisy to be used frequently. This robot displays the results of developing an autonomous mobile robot using some novel concepts that have surfaced "Lessons Learned from Robotic Vacuum. In this area throughout the past ten years. It can be used for Cleaners Entering in the Home.

Both vacuuming and sanitizing. The robot's design is ideal for the job, particularly when it comes to cleaning along walls, around legs, and in corners. Moreover, obstructions may be detected by the front panel's acute distance sensors, enabling the robot to travel.

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