Arduino Based Smart Vaccum Cleaner Robot

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Abstract : It is increasingly difficult to clean homes and the surrounding area with the present hectic routine. There are hoover cleaners on the market right now that need human intervention. Therefore, it is imperative to deploy a hoover cleaner that operates automatically. Through this effort, an effective cleaning technique has been put in place. This hoover cleaner can be used to clean up dangerous areas, lowering the risks to people. By putting in place an autonomous system, this is accomplished. Here, an RC car that has a hoover integrated in it is employed. This system's ultrasonic sensor aids in avoiding substantial obstructions including walls, tables, chairs, and other furniture. Through the use of this sensor, which measures distance, the car steers itself in the direction where there is a greater separation between it and the impediment, preventing a collision. A pipe is hooked to the bottle's mouth and a CPU fan is built into the vacuum cleaner's design. Batteries power the apparatus in its entirety.

Keywords— Arduino Uno, Motor Dc, Motor Shield L298, Ultrasonic Sensor, Robot, Floor Cleaner.

INTRODUCTION

One of the key responsibilities of each and every person is keeping the environment around us clean. More personnel will be required to clean an area that is larger. Some locations may be so filthy that cleaning them has a significant negative impact on health. People are more susceptible to allergies, watery eyes, colds, coughs, rashes, etc. due to the presence of dust in the environment. Vacuum cleaners can be used in the home to clean carpets, cars and other surfaces like floors. Due to the space's size, it can be used well at colleges. Since social distance must be maintained in the current COVID environment, more people cannot clean together. Humanity is getting more and more dependent on digital technology in this period of fast advancement. The majority of the population is employed, so time is never enough. The hoover cleaner can be moved in the desired direction and the time required for the same may be reduced because the Arduino can be programmed to cover certain areas, which is feasible through the car carrying it. In an effort to keep the environment clean, the Indian government launched the Swachh Bharat Mission in 2014.

An automatic hoover cleaner is created in this project. It consists of an attached hoover to an RC car. If an impediment is detected, an ultrasonic sensor attached to the front of the vehicle measures the distance. The car alters its course in accordance with the code if, let's say, there is an obstruction. A battery powers the CPU Fan in a hoover cleaner. A pipe that will collect the dust from the floor is fastened to the front of the cleaner.

LITERATURE SURVEY.

A "Bluetooth control cleaning robot using Arduino" by Mohd. Shahbaz Khan. They have created a robot, and to control it, Bluetooth is used, which is present at both the transmitter and receiving ends. A futuristic "Smart Vacuum Robot" was proposed by Vijayalakshmi M. S-curve planning and sensors are employed for effective working to avoid obstructions. The proposal "Development of Driverless RC Car" was made by Gaurav Dhariwal. The notion of neural networks is used in this paper to construct an automatic vehicle. Using sensors, this locates any obstructions that are there. In this model, Arduino and Raspberry Pi are utilised. A study titled "Development of Intelligent Floor Cleaning Robot" was proposed by S. Yatamono. They have created a smart floor cleaning robot that can navigate, collect dust, and polish the floor to clean the area. The robot comprises of an omniwheel that has a floor-polishing and suction motor built into it. It is programmed in the Arduino IDE using an Arduino microcontroller, and it has Bluetooth functionality so that it can be used with a smartphone that is Bluetooth-connected.

PROBLEMS DESCRIPTION.

To design and develop a self-sufficient robot that will assist people at home who are busy with daily, weekly, or regular cleaning, especially for families with children. For older people, specifically, who lack the ability or aptitude to clean and live alone or in senior homes. Market-available mechanical hoover cleaners are expensive, wasteful in terms of cleaning time, and cleanness. The goal is to build the robot with infrared sensors and bristle brushes on each side to fix the mentioned cleaning execution problems with a photo controller. We have dealt with challenges like

Establishing a hoover requires consideration of the size, force, and position. To do this, we conducted extensive research before introducing a t-n front with 12 volts, which allowed us to clear all types of leftover particles on the floor. Setting up the wiping component The important aspect of wiping is to introduce brushes that can be effectively wetted and don't leave dust behind because

they need to be washed between each use. So, in order to accomplish the same, we used Rubbermaid brushes. sized a pail This is also significant because if we used a large volume basin, the load on the bots would have increased and they would have dropped the display, so we used a 500mL compartment instead.

METHODOLOGY

The steps in developing an Arduino-based smart vacuum cleaner are as follows: defining the cleaning specifications; choosing the necessary hardware components, such as motors, sensors, and batteries; writing the software code using the Arduino IDE; assembling the components in accordance with the design; testing and debugging the system to ensure it satisfies the requirements; improving the design to add features; and documenting the design and code for future use. It takes a combination of hardware and software design and testing to create a useful and effective gadget that can do specific cleaning tasks automatically or manually.

IMPLEMENTATION RESULT

In order to construct a working prototype of an automatic floor cleaning robot utilising Arduino and ultrasonic sensors, hardware design is a design or set of tools.

1. Ultrasonic and servo sensors are used in an Arduino microcontroller circuit. The Arduino Microcontroller is connected to this Ultrasonic Sensor, which serves as a distance detector to help prevent the robot from being blocked by the distance. The Servo also serves as a motion controller to help move the Ultrasonic Sensor.
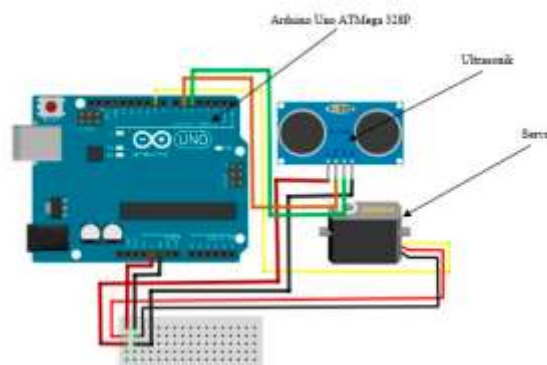
1. Fig:1 Arduino Microcontroller Circuit with Ultrasonic and Servo Sensors

2. Circuit for an Arduino microcontroller with a motor shield L298 and a dc motor. The Motor Shield L298 performs as a motion regulator connected to the Arduino Microcontroller in order to control the motion of the DC motor, and this Dc motor performs as a robot driver that is connected to the Arduino Microcontroller in order to run the robot and mop automatically.
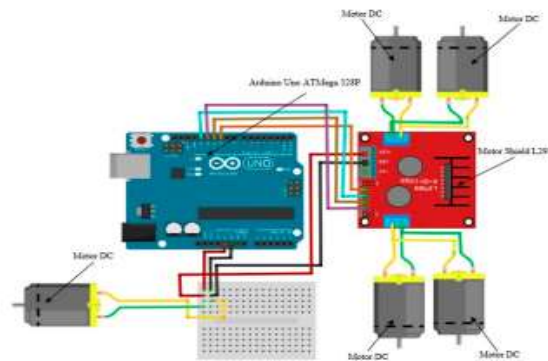
1. Fig:2 . Arduino Microcontroller Circuit with Motor Dc and Motor Shield L298

3. The whole set of hardware configurations. The picture below is a series of prototype automatic floor cleaning robots using Arduino and ultrasonic sensors
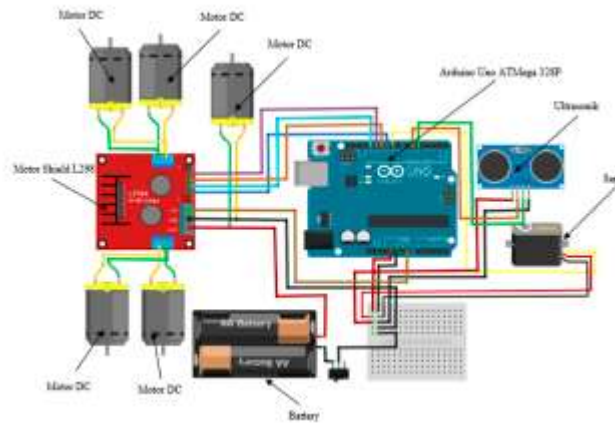

Fig:3 The overall series of hardware configurations

One of the stages in the creation of a system is implementation, which is the placement of a prototype for an autonomous floor cleaning robot so that it is operational and may be viewed as an effort to realise the system that has been designed and is the subject of VPH's study
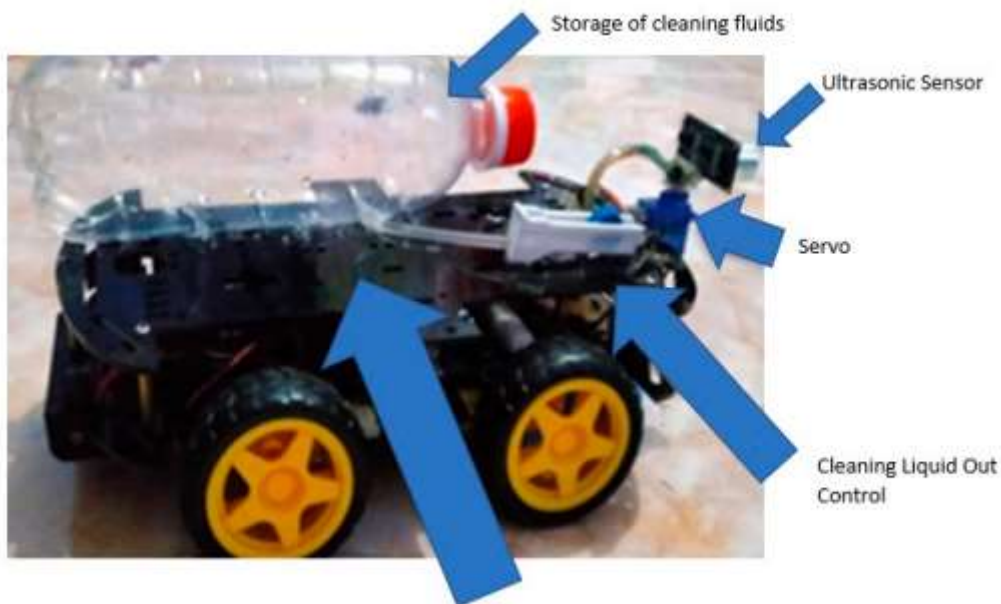

Fig:4 The overall series of hardware configurations

CONCLUSION

based on the conclusions reached throughout analysis, design, and execution. So, some inferences may be made. For example, liang found that the autonomous floor cleaning robot prototype is quite successful in assisting the community or cleaning personnel to clean floors. Create a prototype for an automatic floor cleaning robot utilising an ultrasonic sensor as a distance controller and an Arduino Uno microcontroller as a data processor. If someone blocks the floor cleaning robot prototype, it will move automatically in the other direction. A floor-cleaning robot prototype that uses ultrasonic sensors can more accurately detect obstructions.

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