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Smart Vacuum Cleaner Robot

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ABSTRACT: The purpose of this study is to discuss development of vacuum cleaner robot using an Arduino uno. The main idea is primarily having sensor to sense any object like wall and dust etc... and it avoids the obstacles. Then send the output data to an Arduino that will control the robot vacuum movement. To felicitate target function interactivity in conjunction with high quality senor play an essential role. In this we have multiple options inoperating the robot like we can operate remotely using android mobile by Bluetooth, automatic function just turns on the robot its movies using the sensor, voice command robot movements can be controlled using voice. At present, there are vacuum cleaners which require humans to handle it. Thus, there is a dire need to implement vacuum cleaner which works without human intervention. An efficient method to clean the desired area has been implemented through this project. A smart vacuum robot is a remarkable technological achievement that makes cleaning more efficient, faster, and easier. According to this study, the smart vacuum cleaning robot can be operated manually, automatically, mopped/swept, vacuumed/vacuumed, and observed from 360°. A design of a smart vacuum-cleaning robot is proposed with different characteristics. The Arduino IDE and Proteus Design Suite 8 Professional software were employed for analytical analysis, with a microcontroller serving as the primary control component. The hardware implementation comprises a microcontroller, ultrasonic sensor, and light-dependent resistor (LDR) where the ultrasonic sensor identifies obstacles (trash). Therefore, the LDR emits light and sends the microcontroller's signal to the microprocessor. All the sensors in the proposed system operated flawlessly during the experiment. Moreover, all the sensors were performing perfectly. With additional features of this robot, it can continue its operation during darkness. The proposed robot is equipped with a number of creative and intelligent features that allow it to provide the maximum possible support to employees, housewives, and ordinary people.

KEYWORDS: obstacle Detection Operation Visualization, Bluetooth Control.

I. INTRODUCTION

An Arduino-based vacuum cleaner is a cleaning device that is powered and controlled by an Arduino microcontroller. The Arduino board is programmed to control the motors, sensors, and other components that make up the vacuum cleaner. This allows for a high degree of customization and control over the cleaning process, even navigate around obstacles. Additionally, an Arduino- based vacuum cleaner can be connected to other devices and systems, such as a smartphone or a home automation system, to provide remote control.

They are meant to clean our hardwood floorings, tiles, and carpets of all sorts of dirt and debris similar to regular vacuum cleaners. The biggest difference is that these robots can reduce the amount of cleaning we need to do on a daily basis. We can effectively reduce the physical effort and time we spend keeping our floors clean with the help of a robot vacuum. Although it's a bit costly, it does present a wide range of benefits, justifying our investment. So, this kind of product can have a huge market and can be profitable venture for an investor.

II. BLOCK DIAGRAM
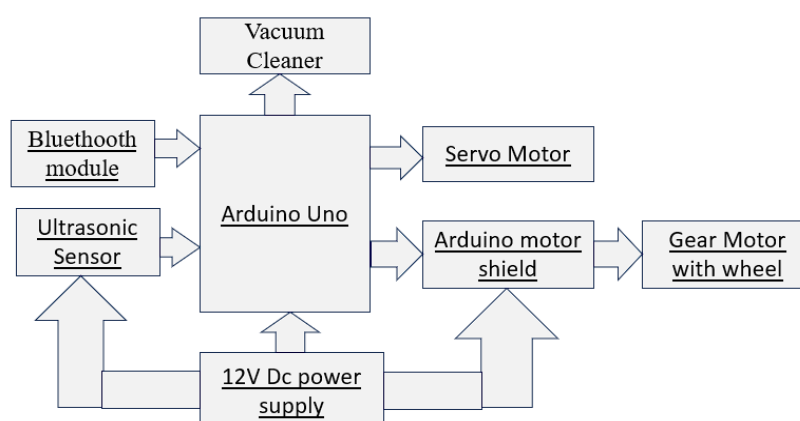
III. CIRCUIT DIAGRAM
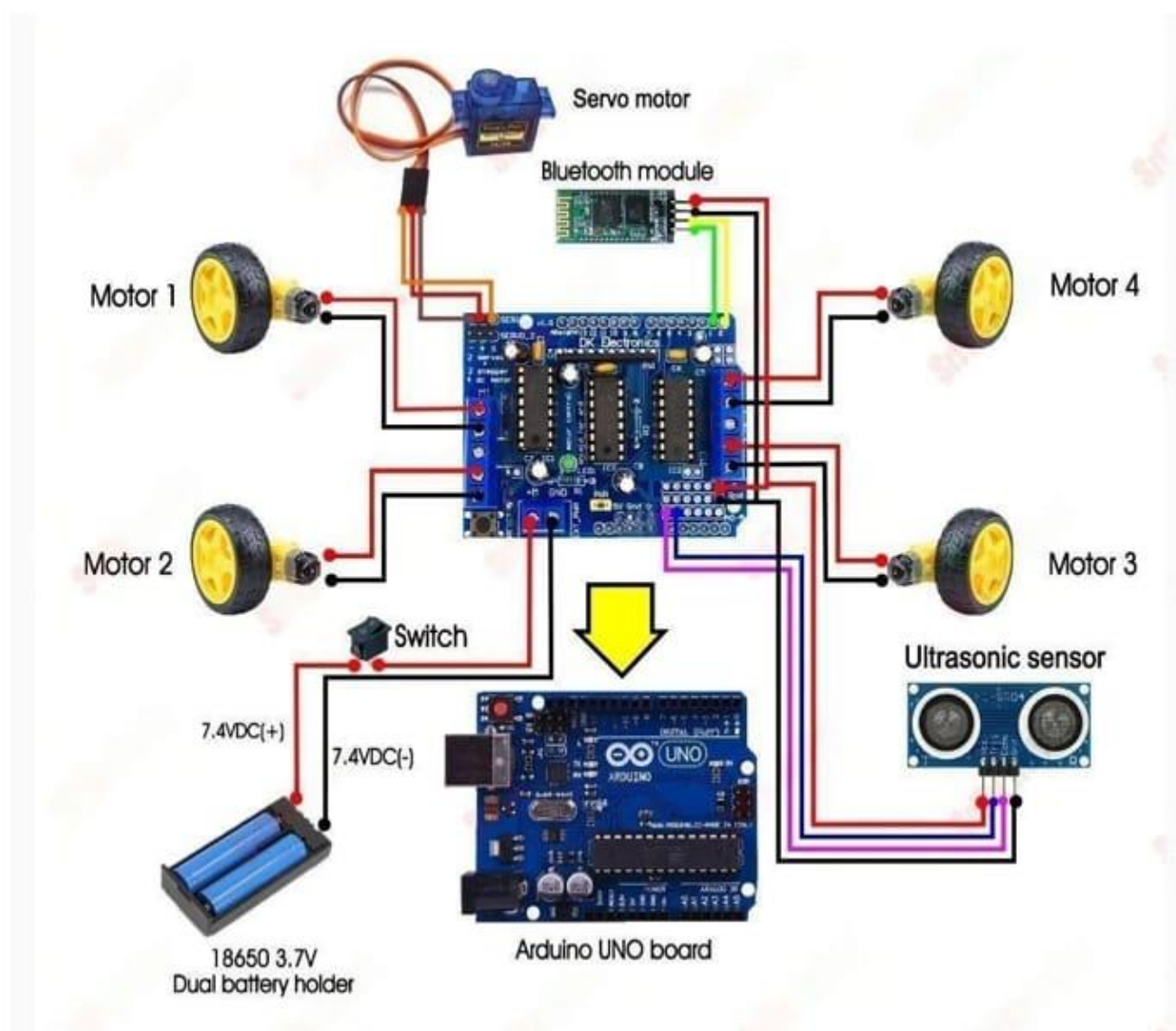
IV. WORKING OF COMPONENTS

- **Arduino Boards-** In this project Arduino board acts as the brain of whole Circuitry.
- **Power Supply-** Single power supply is used for whole components.
- **Lithium-ion battery -** used to provide current in the components.
- **Motor Sheild -** Motor sheild is used to on compact on Arduino and supply current to various components..
- **Gear Motor with wheel -** It converts the electrical energy into rotational energy to rotate the wheel.
- **BMS -** used to charge the Circuit automatically.
- **Servo Motor-** Servo motor is used to give the direction of water to extinguish the fire.
- **Bluetooth Module-** It is used to operate the robot by our Phone/Laptop.
- **Ultra Sonic -**used to detect the obstalce in between them.
- **RS-775 :-** It is the Dc motor that is used with the fan to seek the dust particles.
- **Fan Blade -** It is used for Vacuum the purpose.

V. ADVANTAGES

- It reduces human efforts.
- Save time and energy.
- Lightweight and compact.
- Cleaning y itself .
- Can be remote control.
- Bluetooth facility is also provided.
- Eco friendly.

VI. APPLICATIONS

- Homes.
- Offices.
- Industries..
- Schools/Colleges, etc.

VII. EXPERIMENTAL RESULT

Initialization of Fire Fighter Robot

Fig. 1- Initialization

Ready to clean by robot

Fig. 2- Ready Position

Vacuum Side of Robot

Fig. 3- Vacuum Side

VIII. CONCLUSION

I have successfully developed the Smart Vacuum Cleaner Robot which is capable to detect the dust automatically and goes that place and vacuum the dust. the smart vacuum cleaner project has successfully achieved its objectives of creating a prototype that combines intelligence, automation, and efficiency in household cleaning.

IX. FUTURE SCOPE

AI and Machine Learning Integration: Future smart vacuum cleaners will likely become even more intelligent with AI and machine learning algorithms. These algorithms could enable the vacuum cleaner to learn the layout of a home, identify obstacles, and optimize cleaning patterns over time.

Energy Efficiency and Sustainability: As environmental concerns become increasingly important, future smart vacuum cleaners may focus on energy efficiency and sustainability. This could involve the use of eco-friendly materials, energy-efficient components, and technologies to reduce power consumption during operation.

REFERENCES

1. Manasa, Vidyashree TS, Bindushree V, Sanjana Rao, Gowra PS "SMART VACUUM CLEANER" Global Transitions Proceedings (2021), Volume: 2 Issue: 2, Pages 553-558, November 2021,
2. Charnia Iradat Rapa, Erick Dephtios, Chrisna Mariangga, Naomi Patiung "A DESIGN AND BUILD A ROBOT VACUUM CLEANER" Journal of Physics: Conference Series, Volume: 2394, Issue: 1,doi:10.1088/1742-6596/2394/1/012024, December 2022
3. H.A.ShakhawatHossenPrayash,Md. RagibShaharear , Md. Farhanul Islam, Saiful Islam, Noushad Hossain, and Shamik Datta, "Designing and Optimization of an Autonomous Vacuum Floor Cleaning Robot", IEEE International Conference On Robotics, Automation, Artificial-intelligence, and Internet-of-Things(RAAICON) 29 November – 1 December 2019, Dhaka, Bangladesh.
4. Iwan Ulrich, Francesco Mondada, J. D. Nicoud, "Autonomous vacuum cleaner",Robotics and Autonomous Systems 19 (1997) 233- 245, Laboratory of Microcomputing (LAMI), Swiss Federal Institute of Technology, Lausanne, Switzerland.
5. T.B. Asafa, T.M. Afonja, E.A. Olaniyan, H.O. Alade "DEVELOPMENT OF A VACUUM CLEANER ROBOT" Alexandria Engineering Journal, Volume: 57, Issue: 4, doi:10.1016/j.aej.2018.07.005, Pages 2911 – 2920. July 2018,
6. R. Radha, M. Priya, G. Bhuvaneswari, M. Umapathy, "HAND GESTURE CONTROLLED ROBOT AND OBSTACLE AVOIDANCE SYSTEM USING ARDUINO FOR CLEANING APPLICATION" International Journal of Research in Engineering, Science and Management Volume-2, Issue-2, www.ijresm.com | ISSN (Online): 2581-5792, February-2019.

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