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Review on Automatic Floor Cleaning Using Arduino

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A B S T R A C T

The purpose of an automatic floor cleaner is to assist users in keeping their areas hygienic and clean with the least amount of work possible. Numerous sectors are now developing autonomous cleaning devices through advancements in automation. Developing an automatic floor cleaner is the main topic of this study. In order to minimize human work, robotics is a major focus in today's globe. Designing a completely automated floor cleaner with UV sterilization and dry and wet cleaning capabilities is our aim. Only one or two features are available in the majority of cleaners now on the market. In order to save costs and simplify our design, we have decided to use an Arduino microcontroller. The purpose of this cleaner is to enhance convenience and tackle the drawbacks of conventional floor cleaning techniques.

Keywords: Remote controlled floor cleaner , Automated floor cleaning machine ,Wireless floor cleaning device ,Robot vacuum cleaner, Remote-operated cleaning robot

1. Introduction

Brooms are typically used for cleaning streets, workplaces, residences, and industrial spaces. However, there are a number of health risks associated with broom use, including back pain and skin disorders. Furthermore, it takes a lot of time and human labor. Robots are now being employed for cleaning as a result of technological advancements. Cleaning robots can be costly, too, and only a small number of machines have both wet and dry cleaning capabilities. The exorbitant cost of domestic cleaning robots prevents their widespread adoption in India. Rather, robots are usually used to clean streets, as well as airports and train stations, where they are humanly operated. In this research, a completely autonomous, reasonably priced floor cleaner that can clean both wet and dry surfaces is proposed. For germ sterilization, a UV lamp is provided, which does away with the need for dangerous chemicals like acids. The robot maps the space using a variety of technologies, and the infrared sensor is selected for obstacle avoidance and edge recognition. A microcontroller called an Arduino UNO powers the project. By lowering the cost of mopping robots, we hope to make them more affordable for the typical person and offer a safer, cleaner substitute for conventional techniques.

2. Methods

According to Irawan, the prototype approach has been embraced by researchers because it encourages deeper interaction with program users. The design approach places a strong emphasis on the idea of "listening to the customer," which Muthiah found to be a useful tool for facilitating ongoing input between engineers and clients. According to Muhardi, the developer's job is essentially to make sure that communication is efficient in order to satisfy the customer's system needs. The developer and the client communicate directly during the first step, "Listen to Customer," which prepares them for the "Build/Revise Mock-Up" stage**.** Takeshita talks about how a semi-finished model is made in this step and then sent to the "Customer Test Drives Mock-Up" stage. During this phase, users can test the software and give input on whether it fulfills their needs or whether further features are required. According to Irawan, the method repeatedly repeats the "Listen to Customer" step if any demands remain unmet until the created solution meets the needs of the client.

3. IMPLEMENTATION RESULT

To build a prototype of an automated floor-cleaning robot, hardware design entails planning ahead and choosing the right instruments. For effective functioning and obstacle detection, this prototype makes use of Arduino and ultrasonic sensors.

1. To improve robotic capabilities, a servo motor and ultrasonic sensor are integrated into an Arduino microcontroller circuit. Through data transmission to the Arduino, the ultrasonic sensor determines distances, allowing obstacle avoidance. In the meantime, the Arduino-controlled servo motor modifies the sensor's location for the best possible movement and detection.

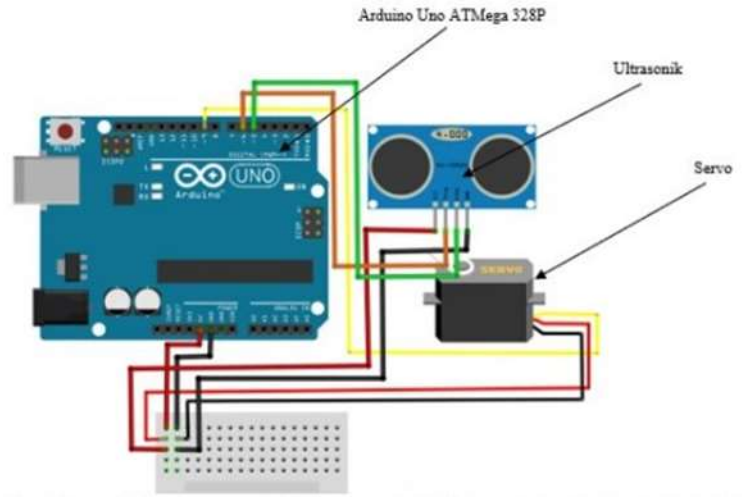


Fig Arduino Microcontroller Circuit with Ultrasonic and Servo Sensors

2. To control the robot's movement, an Arduino microcontroller circuit combines an L298 motor shield with a DC motor. By acting as the driving power, the DC motor allows the robot to move and carry out mopping duties autonomously. By using Arduino control, the L298 motor shield ensures smooth operation by controlling the motor's motion. In this system, Wahyuni studied.

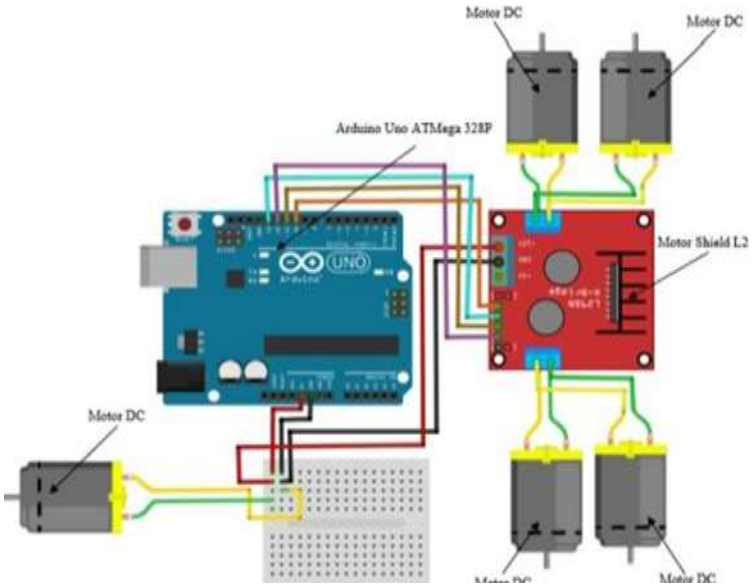
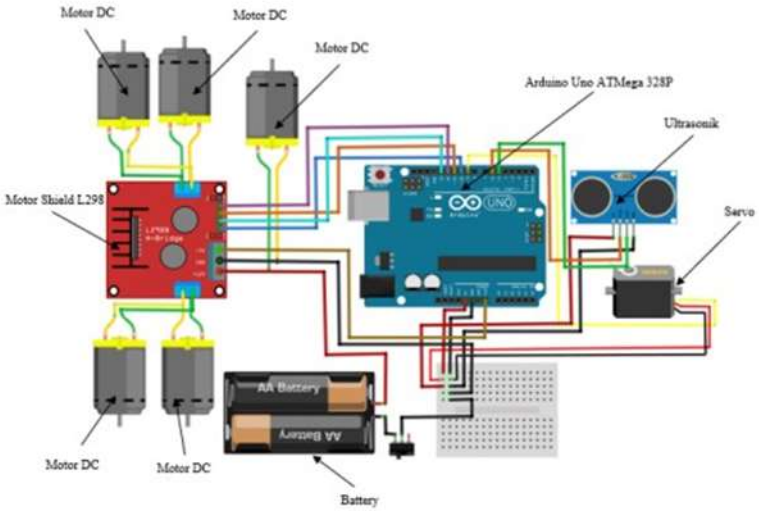


Fig. Arduino Microcontroller Circuit with Motor Dc and Motor Shield

3.The entire collection of hardware setups. A number of prototype automated floor-cleaning robots that use Arduino and ultrasonic sensors are shown in the image below..



4. System Testing

The procedures below are used to test the Arduino Uno system in a prototype floor-cleaning robot:

1. Attach the prototype's battery to its hardware assembly and click the power button.

2. The Arduino Uno, servo motor, DC motor, L298 motor shield, and ultrasonic sensor will all activate once the device is switched on.

3. Next, the ultrasonic sensor measures distances to identify surrounding impediments.

4. When an obstruction is identified, the robot automatically modifies its course to get around it and carry on cleaning.

5. Conclusion

Several conclusions may be made in light of the study, design, and execution that were done. According to Liang's research, the autonomous floor-cleaning robot prototype works well for helping the community and cleaning staff keep floors clean. This prototype uses an ultrasonic sensor to measure distance and an Arduino Uno microcontroller to interpret data. The robot automatically moves in the direction of an open path when it detects an obstruction. The robot can recognize and avoid obstacles more effectively thanks to the addition of ultrasonic sensors.

6. **References**

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