



ISSN: 2454-132X

Impact Factor: 6.078

Available online at: www.ijariit.com

SMART FLOOR CLEANING ROBOT

Dr. N. Kamalakannan¹, S. Ajithkumar², S. Bharathan³, N. Karthik⁴, R. Mahendran⁵
Professor¹, UG Scholar², UG Scholar³, UG Scholar⁴, UG Scholar⁵
Department of Electrical and Electronics Engineering
Agni College of Technology, Chennai, Tamil Nadu, India

Abstract— Households of today are becoming smarter and more automated. Home automation delivers convenience and creates more time for people. Domestic robots are entering the homes and people's daily lives, but it is yet a relatively new and immature market. However, growth is predicted and the adoption of domestic robots is evolving. Several robotic vacuum cleaners are available on the market but only a few implement wet cleaning of floors. The purpose of this project is to design and implement a Vacuum Robot and automatic water spraying system along with a floor cleaner.

Keywords— Arduino Uno, Ultrasonic sensor, DC Motor, Blower

1. INTRODUCTION

A robot is an electro-mechanical machine and is used for various purposes in industrial and domestic applications. Robot appliances are entering the consumer market, since the introduction of I-Robots. Many related appliances from various companies have been followed. Initially the main focus was on having a cleaning device. As time pass on many improvements were made and more efficient appliances were developed. In this research work a floor cleaner robot based on Arduino UNO- has been developed. This cleaner robot is an electric home appliance, which works in two modes as per the user convenience "Automatic and Manual". Unlike other floor cleaner robots, this is not a vacuum cleaner robot. It performs sweeping and mopping operations. The detachable mop is used for wet mopping. It works on a 12V supply. In the automatic mode, the robot performs all operations itself. Firstly robot starts it moves forward and performs cleaning action. For obstacle detection and to avoid hurdles Laser TOF sensors have been used. If any hurdle is detected then the robot change the lane automatically, does not stop cleaning action. It follows a zigzag path for user convenience, water sprayer is attached which automatically sprays water for mopping, therefore is no need to attach wet cloth again and again for mopping. Motor driver circuits have been used to drive the motors.

2. EXISTING SYSTEM

In the existing system is every day many men and women spend their time cleaning the floor of their homes. This task can be only manual. So, we go for a novel proposed system.

3. BLOCK DIAGRAM

The project is implemented using Arduino UNO, Ultrasonic Sensor, DC Motor, Blower.

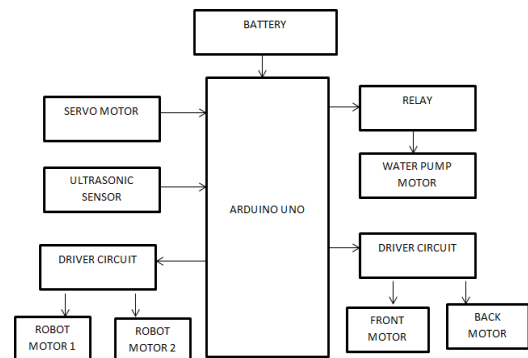


FIGURE 1: BLOCK DIAGRAM OF THE SYSTEM

4. METHODOLOGY

A. ARDUINO UNO

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header, and a reset button. Arduino Uno has several facilities for communicating with a computer, another Arduino board.

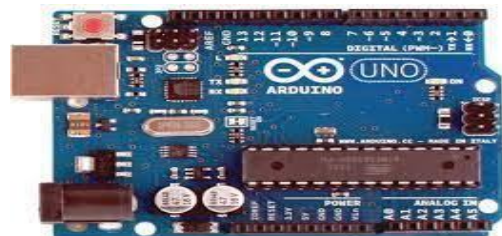


FIGURE 2: ARDUINO UNO

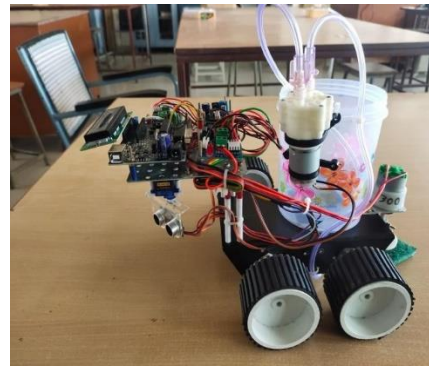
B. ULTRASONIC SENSOR

The ultrasonic transmitter emitted an ultrasonic wave in one direction and started timing when it launched. Ultrasonic spread in the air and would return immediately when it encountered obstacles on the way. At last, the ultrasonic receiver would stop timing when it receives the reflected wave. The distance of the sensor from the target object is calculated.

6. RESULT



FIGURE 3: ULTRASONIC SENSOR



7. CONCLUSION

These systems providing useful solutions while making the floor cleaning mechanism by using the robot. The cost of the system is less and it gives reliable output as compared to another system which is useful for society. To have safe and it is mainly implemented on a long scale for the better results and problem-free solutions in the future. This project “**SMART FLOOR CLEANING ROBOT**” is designed with the hope that is very much economical and helpful for people.

8. REFERENCES

- [1] “Economical Robotic Vacuum Cleaner”, Soundiraraj. P, ShahulGasnikhan.K.T, Dept of Mech, KPR Institute of Engineering and Technology, India
- [2] “Floor Cleaning Robot with Mobile-App or Autonomous”, Vatsal Shah, Dept. of ECE IITE, Ahmadabad, 2015
- [3] The design and application of a robotic vacuum cleaner, Min- ChieChiu, Department of Automatic Control Engineering, Taiwan, R.O.C.
- [4] “Smart mini automatic vacuum cleaner using pic Microcontroller”,Mohamad shaifulfaiz bin abdrahim,
- [5] “Robovac (Autonomous Robotic Vacuum Cleaner)”, Juan Gamarra, Diego Molina, Jetmir Palushi, Raymond Perez, Joseph Seborowski, Stevens institute of technology
- [6] Jens-Steffen Gutmann, Kristen Culp , Mario E. Munich and Paolo Pirjanian. The Social Impact of a Systematic Floor Cleaner. In IEEE international workshop on advancedrobotics and it is social impacts, Technische University Munchen, Germany May 21-23,2012.
- [7] Joseph L. Jones, Newton E. Mack, David M. Nugent, Paul E. Sandin, “Autonomous floor-cleaningrobot,” U.S. Patent 6883201 B2, April 6, 2005.
- [8] J-S. Gutmann, E.Eade, P.Fong and M.E. Munich. Vector field SLAM. IN Int. conf. on Robotics and Automation (ICRA), 2010.
- [9] J-Y. SUNG, R.E.Grinter, and H.I.Chrstensen, and L.Go.Housewives domestic robot technology int. Journal of social robotics, 2(4):417-429,2010.
- [10] M.R.B. Bahara, A.R. Ghiasib, H.B. Bahara, "Grid roadmap-based ANN corridor search for collision free, path planning ",ScientiaIranica (2012) 19 1850-1855.
- [11] Pyxus, James Philip Case, and Nikolai Romanov, “System and method for autonomous mopping of a floor surface,” U.S. Patent 8 892 251 B1, November 18, 2014.Tresanchez M, Yao-Shih Leng,“Cleaning robot and control method thereof,” U.S. Patent 20130231819 A1, September 5, 2013.

C. DC MOTOR

Geared dc motors can be defined as an extension of dc motors. A geared DC Motorhas a gear assembly attached tothe motor. The speed of the motoris counted in terms of rotations of the shaft per minute and is termed as RPM. The gear assembly helps in increasingthe torque and reducing the speed. Using the correct combination of gears in a gearmotor, its speed can be reduced to any desirable figure. This concept where gears reduce the speed of the vehicle but increase its torque is known as gear reduction. A DC motor can be used at a voltage lower than the ratedvoltage. But, below 1000 rpm,the speed becomes unstable,and the motor will not run smoothly.



FIGURE 4: DC MOTOR

D. BLOWER

The Suction motor is one of the most important parts of a vacuumcleaner. It is this motor that takes the electrical power from the power source and converts it into mechanical power in the form of suction with airflow. The suction motor on most vacuum cleaners typically draws seven to twelve amperes of current from the electrical power source.



FIGURE 5: BLOWER

5. WORKING

Arduino UNO is the heart of the Our project. It Controls the overall function of this project. It operates at a 5V power supply. Codingis Dumbed in the microcontroller. We are used six motors in our robot. one motor is used to control the ultrasonic sensors moment right and left direction for the obstacle Detection. Another motor is usedfor mopping purposes and it's a 300rpm motor. Another motor is thepumping motor is used to spraying the water to the mopping position of the robot. Another two motors are 30rpm motor these two are controlling the movement of the vehicle. Finally, One is blower motor is used to collectthe dust on the floor it's a 500 rpm motor the collected dust is stored in the container fixed bottom of the robot.