Comparative Study on Floor Cleaner

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ABSTRACT

The research paper details the development of Automatic Floor Cleaner. The used for domestic and industrial purpose to clean the surface automatically. When it is turned ON, it sucks in the dust by moving all around the surface (floor or any other area) as it passes over it. The controller is used to drive the motors and the suction unit also a couple of sensors is used to avoid the obstacles. This can be useful in improving the lifestyle of mankind. In this paper, we implemented a human-friendly cleaning robot system for the domestic ubiquitous environment. Though conventional automatic cleaning robots already exist, these robots do not work in sync with humans. These robots' cleaning operations often obstruct a person in the home.

Keywords: Arduino, LCD, KEYPAD, RF MODULE, IR SENSOR.

1. INTRODUCTION

In the modern era, the Automatic Floor Cleaner is required. Thus, the cleaner is designed in such a way that it is capable of cleaning the area reducing the human effort just by starting the cleaning unit. In the paper, main focus is to build and program it in such a way, that it can move around freely and clean a specific area by the vacuuming process. The idea of

cleaning robot is not a new idea but it is very vast. An implication on cleaning robot was done by using various techniques such as by using Rasp-berry Pi, Arduino also by using the 8051 microcontroller. Every implication was having advantages and limitations too. On the basis and study of those limitations new inventions were carried out. Here in this project we are using PIC controller. The innovation in this project is obstacle avoidance. Here we are using sensors to detect the obstacles. The cleaning robot uses a microcontroller to detect obstacles and manipulates its direction as per the input from sensors mounted in front; right and left of the robot and the distance will be rerouted automatically.

2. LITERATURE REVIEW

Vacuum cleaning system

Vacuum cleaning system used in this robot is Cyclonic type filtration system which works under the principle of forced vortex flow same as in case of centrifugal pump. Centrifugal force will be created and all types of debris will be sucked in through pipe. The advantage of using this robot will saves time, it will be very much useful for people with mobility issues to clean the house without any difficulties. It is a simple and low cost robot.

Automatic floor cleaner robot Mint In this paper, the mint cleaning robot which is an automatic cleaning robot that sweeps and mops hard–surface floors using dusting and mopping clothes was developed. It investigates the product's social impact with respect to the attitude of the customers towards a systematic floor cleaner and how such a robot influences their lifestyle. Systematic cleaning was an important feature, and modifications to the environment to support the navigation of robot. The robot employs a systematic cleaning strategy that maps the environment using a GPS-like indoor localization[11].

In this paper autonomous and automatic home Mess-Cleanup robot (Mcbot) is newly developed. So far, the vacuum cleaner had made the burden of house core light and but the operational labor of a vacuum cleaner had been so severe. In this paper the RFID tags are used to sense the obstacle and propose the new disposition algorithm to have RFID tags installed on the floor and objects indoor. It needs to also have an intelligent interaction function for the human-friendly communication. RFID tags are installed to detect the obstacles which are costly and complex[10]. This paper presents a floor cleaning robot equipped with Swedish wheels. It can be used in crowded places such as houses, train station; airport etc. The robot can perform its work in autonomous mode. Moreover the robot can pivot around without turning, can avoid obstacles and is provided with automatic power management ability and meanwhile, the kinematics for its control and controlling methods are studied and demonstrated. This new structure, smooth locomotion capability and high working efficiency are verified by experimentation. Vacuum cleaning can be done by this robot and ultrasonic detections sensors are used for obstacle detection[11].

In this paper a new type of home intelligent cleaner adopted the ultrasonic and infrared sensor array, which has the function of the real-time environment perception, is introduced, and this cleaner driven by step motor has the ability of autonomous working by itself and the

functions of the automatic detection and obstacle avoidance. This paper adopts grid scanning algorithm based on electric map realize floor coverage task, and designs synthesis detection system based on sensor arrays finding method technology according to algorithm characteristics, experimental results for obstacle detection by static finding indicates that the design detection systems improves cleaning robot's environment perception and path search ability greatly[12].

We decided to work on design and development of floor cleaner robot project. For the information we search on internet and some reference books also. When we search on internet we found some IEEE Research papers as follows: P. Shuklaand *et al.*, they suggested that the robot is based on PIC16F877A and the main purpose of project is that it is used as vacuum cleaner and inspection robot. In this project we can't use many application at a time due to the low functionality of[1] N. Prashar *et al.*, They suggested that the camera is set in ceilling of room which is to be clean in position in which it can have a complete view of the floor then camera takes the images of the floor and transmits them to uses PC display .Next, the user is provide with two modes of cleaning. Automatic Mode in which robot automatically dust and cleans it. Manual Mode in which user can select a desired position to be cleaned by clicking on it on the image being generated on screen .In automatic mode the first position of robot is estimated and then destination position that is area to be clean calculated .Then click coordinates are forwarded to robot and the robot moves to location. In above paper there is only one main application is provided that is dust cleaning device.

U. Khalid *et al.*, explains this paper. In this paper, "smart floor cleaning robot (CLEAR)" has been designed for consumer/office environments and its each component in accordance with IEEE Standard is discussed. Proposed design is being operated in dual modes. In one of the modes, the robot is fully autonomous and making decisions on the basis of the outputs of infrared proximity sensors, ultrasonic sensors and tactile sensors after being processed by Arduino (mega) controller and control the actuators (2 DC encoder motors) by the H-bridge driving circuitry.[3]

REFERENCES

1. Priya Shukla and Simmy S.L. "Design and Inspection of cleaning robot." Issued volume 3, Issued 6. Sept (2014).
2. Nikita Prashar, Tejashri Thorat, Abhishek Galande, Ritesh Durande "Cleaning Robot."
3. Uman Khalid, Muhammad Faizan Baloch, Haseeb Haider, Muhammad Usman Sardar, Muhammad Faisal Khan, Abdul Basit Zia and TahseenAmin Khan Qasuria "Smart Floor Cleaning Robot (CLEAR)".
4. Design and Development PIC- Based Autonomous robot- Gow Moh Kee and Zainah Md. Zain, Rahmatul Hidayah Salimin.
5. Design and Construction of an Autonomous Cleaner Robot, for an aquatic Environment- A. Rincón-Suárez, M. Rubín-Falfán, E. Sánchez-Sánchez and G. Trinidad García.
6. Manya Jain, Pankaj Singh Rawat, Automatic Floor Cleaner. *International Research Journal of Engineering and Technology (IRJET)*e-ISSN: 2395 -0056, Volume: 04 Issue: 04, p-ISSN: 2395-0072 (Apr -2017).

7. Taware R. D.,Vaishali Hasure, Puja Ghule, Komal Shelke Design and Development of Floor Cleaner Robot (Automatic and Manual Mode). *International Journal for Research Trends and Innovation, IJRTI*, Volume 2, Issue 4, ISSN: 2456-3315 (2017).

8. Swati Pawar, Naman Aggarwal, Piyusha Chaudhari, Akshay Mahalkar, Anshul Mishra. *Review Paper Based on Cleaning Robot IJRE*, Vol. 03 No. 05, (May 2016).

9. Manreet Kaur, Preeti Abrol Design and Development of Floor Cleaner Robot (Automatic and Manual) *International Journal of Computer Applications* (0975 – 8887) Volume 97– No.19, (July 2014).

10. Evolution Robotics Inc. Introducing Mint-the evolution of floor care, www.mintcleaner.com, (2011).

11. Jens-Steffen Gutmann, Kristen Culp, Mario E. Munich and Paolo Pirjanian. The Social Impact of a Systematic Floor Cleaner. In IEEE international workshop on advance robotics an its social impacts, Technische University Munchen, Germany May 21-23, (2012).

12. S. Gutmann, E.Eade, P.Fong and M.E. Munich. Vector field SLAM. IN Int. conf. on Robotics and automation (ICRA), (2010).

13. J-Y. Sung, R.E. Grinter, and H.I. Chrstensen, and L.Go. House wives domestic robot technology int. *Journal of Social Robotics*, 2(4):417-429, (2010).

14. Youngkak Ma, Seungwoo Kim, Dongik Oh and Youngwan Cho.A study on development of home mess- cleanup robot McBot. In IEEE/ASME international conference on advanced mechatronics July 2-5, Xian, China (2008).

15. Xueshan Gao, Kejie Li, Yan Wang, Guangliang Men, Dawei zhou and Koki Kikuchi. A floor cleaner robot using Swedish wheels. In IEEE international conference on robotics and biomimetics December 15-18, Sanya, China (2007).

16. G Tuangzhi Dai and Tiequn Chen. Design on measurement and control system of cleaning robot based on sensor array detetion. In IEEE International conference on control automation Guangzhou, China-May 30 to June 1, (2007).

17. J Frolizzi C.Disalvo. Service robots in the domestic environment: A study of Roomba vacuum in the home". In int. conference on human robot interaction HRI, Page 258-265 March (2006).

18. H. Asada and J.-J E. Slotin, robot analysis and control, a wiley-interscience publication, pp. 29-49 (1986).