

IOT BASED SMART AUTO CLEANER ROBOT USING NodeMCU

Sanchit Kumar pal¹, Arpit Saxena², Harshit Gautam³, Anjani Kumar⁴, Ast. Prof. Preeti Singh⁵

¹U.G. Student, Electrical Engineering, Axis Institute of Technology and Management, Kanpur, UP, India.

²U.G. Student, Electrical Engineering, Axis Institute of Technology and Management, Kanpur, UP, India.

³U.G. Student, Electrical Engineering, Axis Institute of Technology and Management, Kanpur, UP, India.

⁴U.G. Student, Electrical Engineering, Axis Institute of Technology and Management, Kanpur, UP, India.

⁵Professor, Dept. of Electrical Engineering, Axis Institute of Technology and Management, UP, India.

Abstract - An The goal of this examination is to plan and build up a minimal effort NodeMCU self-governing robot cleaner utilizing mapping algorithm to clean floor space of houses or workplaces. The thought is essentially to recognize any snags with the assistance of sensor and sent its yield to microcontroller that will control the self-governing cleaner movement. This device will clean the floor (dry as well as wet cleaning) with high accuracy and well functionalized electronic and mechanical control system. This smart robot is based on the two modes of working, manual as well as automatically. In this robot, we are using UV lamp for killing bacteria. All hardware and software operations are done by NodeMCU microcontroller. Through the IOT all the wireless communications done.

This system is highly automatic and cost effective, which makes it more prominent than the existing vacuum cleaners. Apart from all these, fire alarm system is also associated with this. Fire detection sensor will be there which detects the fire and then signal will transfer through the IOT to the user. This cleaner can be used from anywhere through Blynk App.

1. INTRODUCTION

A mechanical vacuum cleaner regularly alluded to as a Robo Vac, is a self-governing automated vacuum cleaner with canny programming and an electromechanical control framework with high soundness and fast usefulness. In 2002, iRobot, an American trend setting innovation organization, dispatched a mechanical vacuum cleaner called Roomba. The Roomba had the option to alter course when it experienced a snag, messy spots on the floor, and identify steep flotsam and jetsam to keep the steps from tumbling down. Furthermore, a self-ruling robot can likewise learn new information, for example adjusting new techniques to play out its errands or adjusting to evolving conditions. The vacuum cleaner robot ought to have an artificial intelligence system to tackle the issue of cleaning the whole environment region, considering certain factors like the quantity of turns and the length of the trajectory. There have been new varieties in automated vacuum cleaners available since 2002. For instance, the Canadian bob sweep robot vacuums cleaner, which utilize the both wipes and vacuum, or the Neato RoboticsXV-11 robot vacuum cleaner, which utilizes laser vision rather than regular ultrasonic models. In 2014, Dyson reported the

delivery of its new mechanical vacuum cleaner, Dyson 360 Eye, furnished with a 360-degree camera mounted on the highest point of the automated vacuum cleaner or preferred route over different brands. The organization is investigating mechanical technology and AI to make better automated vacuum cleaners later on. Four necessities ought to be met by a completely self-ruling robot. To begin with, the robot ought to have the option to acquire natural data. For a robot to connect conduct with an area, it should know where it is and have the option to explore from one point to another. Current business robots explore self-governing dependent on the acknowledgment of common features. Second, the robot can move entirely or halfway through its working environment without human help. The benefit of a robot vacuum cleaner contrasted with regular vacuum cleaners is more advantageous because of its small size and can likewise be vacuumed by itself. Thirdly, a self-ruling cleaner ought to have the option to keep away from circumstances which are destructive to people, property or itself except if this is important for its design specifications.

Basically, this project plans to build up a self-ruling IoT-based smart auto cleaner that utilizes a low-cost sensor to recognize any deterrent and send its outcome to a microcontroller that controls the robot's movement. With the independent smart auto cleaner, the client can turn on the robot for cleaning utilizing the controller or through Blynk app on any Android Phone. When this machine is ON mode, it moves all through the floor and effectively covers a whole floor territory. Moreover, the attractions force of this robot should be adequate to gather dust, sand, human or pet hairs and some small shakes that are conceivable discover inside. Smart Auto cleaner Robot will do wet cleaning when the dry cleaning completed. There is a UV lamp connected with the robot which kills the bacteria when our cleaning process completed.

2. LITERATURE REVIEW

IAs robotic innovations have developed and get basic, individuals have attempted to substitute human work with new mechanical advances in self-sufficiency, particularly where individuals can face challenges at work. Robots have as of late, arose as domestic devices as human requests increment. Advanced mechanics research for home devices is getting more dynamic than any other time. The market for

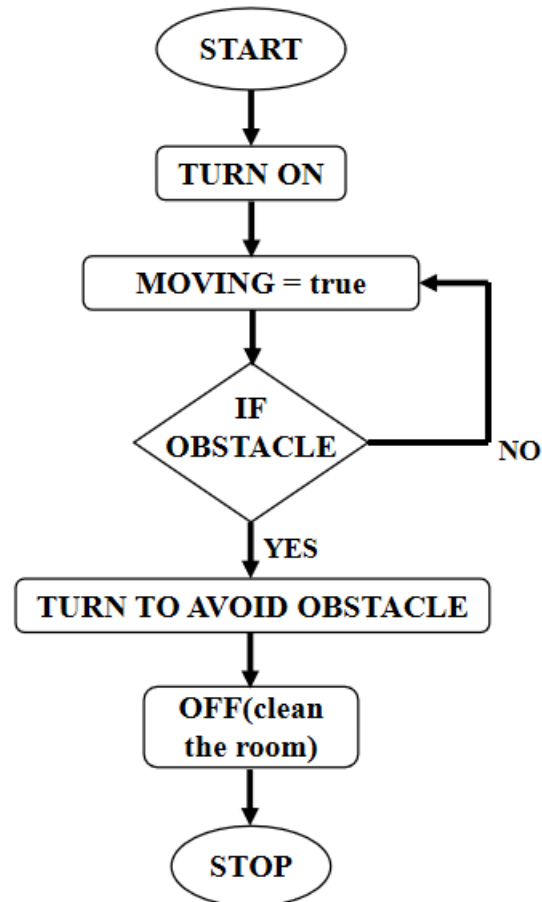
cleaning robots is required to develop from USD 1.83 billion out of 2017 to USD 4.34 billion of every 2023, with CAGR (Compound Annual Growth Rate) at 16.21% somewhere in the range of 2018 and 2023, as indicated by semiconductor and hardware statistical surveying. Moreover, The Medium and Long Term Science and Technology Planning of China (2006 to 2020) have been plainly settled that the self-ruling will be a power upgrade of innovation later on. It is notable that cleaning a huge territory is an unendingly exhausting errand that requires a ton of time and exertion. Right now, the cleaning robot can be partitioned into the vacuum cleaner, the wiping robot, and so forth as per different capacities. The mechanical vacuum cleaner was presented before among every one of these robots. Electrolux presented the principal self-sufficient vacuum cleaner in 1996. The early automated vacuum cleaners neglected to keep away from deterrents and low tidiness. Thus, this cleaner can't be effectively brought to showcase. The UK innovation organization Dyson built up a mechanical vacuum called DC06 in 2001. Because of its excessive cost, be that as it may, it was never delivered available.

Since 2002, a large portion of the cleaning robot's examination has centred around decreasing advancement expenses and building up a profoundly productive cleaning robot. There are numerous upgrades made utilizing different sensor and way arranging calculations to chronicle the objective. In proposed a multifunctional floor cleaner in which can wipe and furthermore vacuum the floor. In, has built up an autonomous cleaning robot to eliminate dust from the sun powered board to augment the sunlight based board's life and proficiency. In, proposed a self-ruling automated vacuum cleaner with 3D vector facilitates for the arranging of robot courses. At that point, came Smart Dustbin is to put sensors in the holder to distinguish the degree of trash. When the trash arrives at the limit, the situation with the container in the cloud is refreshed and a notice is shipped off the client. The trash that gathers in trash containers is gathered at the hour of day, regardless of whether the trash canisters are occupied whenever. In this way, the current innovation isn't productive as the arising innovation IoT is thought of. IoT parts like sensors, locators and actuators are explicitly incorporated with the Intelligent System (IS) and examination framework to guarantee proficient garbage removal.

The vast majority of the works above require badly arranged tasks and additionally exorbitant arrangements. In this manner, there is basically to decrease the framework plan intricacy, savvy and all inclusive accessibility of the foundation. The development of data innovation and the utilization of unavoidable figuring innovation have happened in numerous applications, including garbage removal. Accordingly, propose completely robotized indoor garbage removal to supplant traditional removal offices by utilizing a versatile waste assortment robot. This technique is

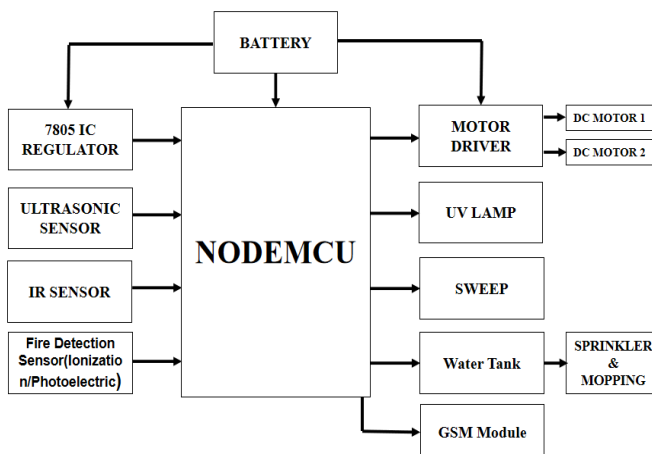
unquestionably a period successful interaction than as of now utilized strategies.

3. METHODOLOGY



The user can select between two algorithms: wall follow and random walk. When the robotic cleaner competes with obstacle avoidance, the choice to take would be different if a different algorithm is used. The motor will begin to operate and dry & wet cleaning start until the system is powered. Furthermore, all of the sensors will begin to gather and process environmental data within NodeMCU. The robot can continue to move around the workspace until its battery wears out or it receives an OFF order from the operator. When the user selects the random walk algorithm, the subroutine is renamed. First and foremost, the robot can inspect the barrier directly in front of it. If this is the case, the robot can come to a halt for a short period of time to enable the DC motor to engage. The robot is designed to reverse a little and then turn left (reverse the left wheel and forward the right wheel). If no, the robot can determine if the barrier is to the left or to the right and use the same algorithm but rotate in the opposite direction. The robot can continue to go forward as long as there are no obstacles.

When the user selects the wall follow algorithm, the subroutine is renamed. First and foremost, the robot can determine if there is an object directly in front of it or if the robot is approaching a corner. If this is the case, the robot can come to a halt for a short period of time to enable the DC motor to engage. The robot is designed to reverse a little before turning right (reverse the right wheel and forward the left wheel). If no, the robot will determine whether or not the robot is approaching an edge. If yes, the robot will pause for a moment before moving on and turning left. Furthermore, the ultrasonic sensor on the left will still ensure that the robot runs at a steady pace along the wall. The sensor is connected to the microcontroller, which controls the actuator to execute certain functions under certain conditions. In this mission, an ultrasonic sensor was used to avoid obstacles. For example, the robot is programmed to respond when an object 10cm in front of the ultrasonic sensor is detected. The red board in the upper left corner is the L293D motor pilot. To adjust the rotation speed, two EN pins, ENA and ENB, must be connected to PWM pins on the NodeMCU.



4. KEY FEATURES

1- Smart Auto Cleaner Robot will clean the floor (dry as well as wet cleaning) with high accuracy and well functionalized electronic and mechanical control system. This smart robot is based on the two modes of working, manual as well as automatically.

2- It uses UV lamp for killing bacteria. All hardware and software operations are done by NODEMCU microcontroller. IOT have been used for wireless communication.

3- This system is highly automatic and cost effective.

4- It has fire alarm system is also associated with this. Fire detection sensor will be there which detects the fire and then signal will transfer through the IOT to the user.

5- This model is operated through wirelessly from anywhere through Blynk App.

5. CONCLUSION

The aim of this project was to design and build a low-cost, smart Internet of Things (IoT)-based autonomous smart auto cleaner that could operate in an unknown world. Despite the fact that the robot has a limited number of sensors, this aim has been fulfilled by the algorithms that have been implemented. Through Blynk app this smart cleaner can be controlled from any Android smart phone, making production easier and providing a more user-friendly interface not just for regular users but also for visually disabled people. The walk follow and random walk algorithms were successfully applied, allowing the robot to automatically solve all of the situations considered. Nonetheless, robot production offers limitless opportunities to increase results and solve further circumstances in an unfamiliar world. Future robot architecture would therefore require visualisation technology, an automated charging algorithm. This smart auto cleaner is developed to make cleaning process easier especially for working people and also for those who have not sufficient time to clean their house regularly.

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