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ELEGANT FLOOR CLEANER ROBOT WITH ANDROID

Babita Anant Pore,Prof.Priti Rajput

Software Developer, Professor

Master of Engineering Electronics

Dr..D. Y. Patil School of Engineering, Ambi, Pune, India

Abstract: At this point, we put forward an elegant floor cleaning robot that allows for remote floor cleaning. The bot makes floor cleaning very trouble-free and a quick process by means of a wireless robotic cleaning system. The user may be seated at a place, set up a bot and clean wherever required. The structure consists of a transmitter app. This app is run in an android mobile phone that lets user broadcast commands based on user input. As per these commands, the transmitter sends movement commands to the robot. Then the transmitter is an android mobile phone that allows the user to transmit commands to the robot. The robot is having 2 cleaning pads with a water sprayer for well-organized cleaning. The robot has 2 motorized rotating clean-up scrubs for the cleaning part. On getting the movement commands from the android. On getting the movement commands from the android device all the way through Bluetooth receiver. Then the microcontroller on receiving the commands decodes them. Afterward operates the motors in order to pull off the desired motion. Still, the sprayer and cleaner system can be restricted by the android app user. This makes floor cleaning a very trouble-free, speedy and easy process.

Index Terms - Robot , microcontroller ,android mobile app, Bluetooth receiver, cost efficient.

I. INTRODUCTION

In modern years, robotic cleaners have taken foremost attention in robotics research due to their value in assisting humans in floor cleaning applications at homes, hotels, restaurants, offices, hospitals, workshops, warehouses and universities etc. essentially, robotic cleaners are notable on their cleaning skill like floor mopping, dry vacuum cleaning etc. thus there is a need of bringing uprising in the area of science and technologies, which could help with no trouble in repetitive tasks which we complete daily. An suggestion on cleaning machine was done by using a variety of techniques such as using Rasp-berry Pi, Arduino ,PIC controller and so on. each implications has its advantages and boundaries too. On the basis and study of those limits new inventions are carried out .

There is broad variety of robots easy to get to for cleaning based on their structure and performance. These are categorized as like:

1.1. Hand-Held: Handheld vacuums are perfect for getting those worryingly difficult to-achieve territories that immediately involve a cleaning. As its name put forward it can be handled single handed.

1.2. Canister: Canister vacuum cleaners are a pleased medium among the upright model and the attach display. They are competent like the upright cleaners, still emphasize a slim edge, like the stick cleaners. For this condition, a diverse canister is linked to a long wand which can be utilize to keep up enclosed regions as well as exposed ground surface too. This style of vacuum cleaner tends to stand out between the most luxurious options, given its automatically forward and multi-practical plan.

1.3. Upright: These models present the most talented of putting your house in order and contribution the impromptu advantage of skills and extras regularly simple since many people have utilized an upright vacuum cleaner in any event previously in their lifetime. the majority models provide settings that allow these vacuum cleaners to be utilized on enclosed surfaces as well as exposed floors.

1.4. Stick: These vacuums have a capacity for getting into boundary puts and completing a enormous activity on hardwood floors, country mats and light covering. This type of vacuum includes a long stick-like touch and a slim expansion. The thinness of this model makes it an perfect growth to any storage room space, as it tucks completely into most corners after its inspiration has been served.

1.5.. Autonomous: These vacuums can go without reserve around your home, sucking up any little disorder in its way. They stand by your time, as well as prepared to attain places that bigger vacuums wouldn't have the ability to. One standard downside of robot vacuums is that they usually come at a superior cost.

This robot will be using water storage space which is pumped with water pump motor. This robot on getting the commands from the android device cleans a area using a cleaning pad by spraying water on the floor. once cleaning the wet floor, it can drain the dirty water into the essential container as per the commands given to it. The robotic arm is used for well-organized and effective wet floor cleaning purpose. This system can also be used to single out up the objects and take them inside the Bluetooth range. The planned system is a manual system since it is controlled by android application which is operated by person. The proposed system carrying out is completely depended on the commands that are established from the android app.

Here in this project we use 8051 Microcontroller. The originality in this project is obstacle forestalling and control by means of android app via Bluetooth. Here we are using sensor to become aware of obstacles. The cleaning machine uses a microcontroller to notice obstacles and manipulates its route as per the input from ultrasonic sensor mounted in front and the machine would stop without human intervention.

II.PROPOSED CONCEPT

This Project is a complete independent android based machine. It is competent of cleaning the room with just a little human communication and all the mechanisms work at the same time. The main principle of our project is to shore up the ―Swachh Bharat Abhiyan‖ initiated by our respectable Prime Minister Mr.Narendra Modi.

Common Specifications:

- Battery operated floor clean-up machine .
- Requires little human involvement.
- suitable product that can be used to clean the room exclusive of much physical effort.
- Saving person precious time.
- All mechanisms work concurrently .

The Various components that from the building blocks of project is shown below:

2.1. AT89S52 Microcontroller

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller by way of 8K Bytes of Flash memory. The device is put on with Atmel's high-density nonvolatile memory technologies and is well-matched with all the industry-standard 80C51 instruction set and pin out.

2.2. Bluetooth Module

The Bluetooth operating range is 2400-2483.5MHz. Frequency-hopping extend spectrum technology is used by Bluetooth. The data transmission is through in packets and each packet is transmitted on any one of the Bluetooth channel which has a bandwidth of 1MHz. Bluetooth 4.0 allows spacing of 2MHz for 40 channels. The preliminary frequency of first channel starts at 2402MHz and continues up to 2480MHz in 1MHz steps. It performs 1600 hops per second, with adaptive frequency-hopping (AFH) enabled.

2.3. L293D Motor Driver

The IC L293D is a Motor Driver IC which allows DC motor to force on either direction. L293D motor driver IC has 16 pins which are used to direct a set of two DC motors at once in any direction. It is based on the idea of H-bridge. The direction of voltage or current flow will be determined by the H-bridge

2.4 .Water Pump Motor

This is a little cost, small size Submersible Pump Motor which can be operated from a 2.5 ~ 6V power supply. It can take up to 120 liters per hour with very low current expenditure of 220mA. Just join tube pipe to the motor outlet, dip it in water and power it.

2.5. Robotic Chassis

The Chassis is a framework which supports the body of a robot. It is a motor vehicle frame on which one can set up the body of the robot.

III. PROJECT BLOCK DIAGRAM

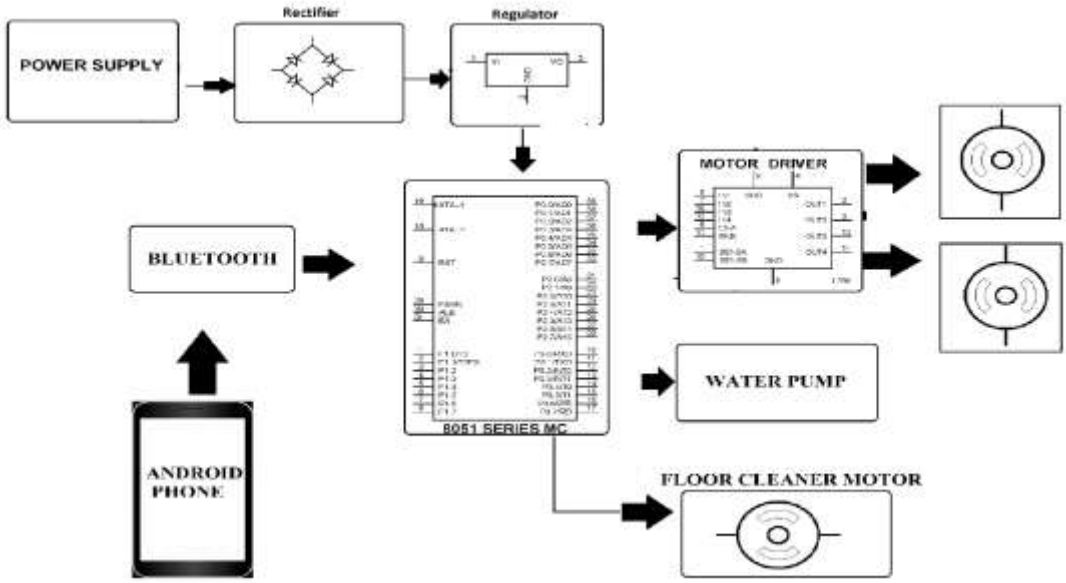

fig 1: Block Diagram

IV. WORKING

The highly developed floor cleaning robot works in automatic mode. once the power button is switched on the power LED glows and the hardware starts functioning. It proceeds the work sensing the corners by means of the ultrasonic sensors. At this time with the help of the ultrasonic sensor linked in the front part of the robot, the sensor actions the distance to the front obstacle. If the distance is larger than 15cm, robot starts affecting forward. The dc motors associated across the wheel controls the motion of robot. At the same time the third motor with the assist of relay circuit, controls the vacuum cleaner in such a manner that the utmost amount of dust is being sucked .This process continues till the subsequently corner is being detected. If the distance between the corner and the robot becomes less than 15cm, the sensor senses the obstruction and the hardware stops. As per to the side of corner, the hardware decides to mover right or left.

Suppose that the robot require to move right. A wheel turning system is being provided to turn the robot to shift right side. At the moment the sensor related in the back side checks the distance between the obstacles and if the distance is greater than 15cm, the robot moves backwards and this route continues till the entire area is being completed
The microcontroller is the brain of our structure that takes all the judgment as per the inputs that are provided to him from the gears like Bluetooth module, ultrasonic sensor and so on. The DC motor is associated to the microcontroller via DC motor driver and our cleaning system consists of mop and broom that does dry cleaning. The heart of our system is crystal circuit, and the process speed of machine is reliant on the frequency provided by the crystal. The crystal circuit provides he frequenct of 11.0592 Hz. In some case a condition may come about that demands resetting the complete ciruit for this the reset circuit is used.

V. SOFTWARE

The Keil 8051 Development Tools are intended to solve the difficult problems facing embedded software developers.
Many example programs are built-in to help you get started with the most well-liked embedded 8051 devices.

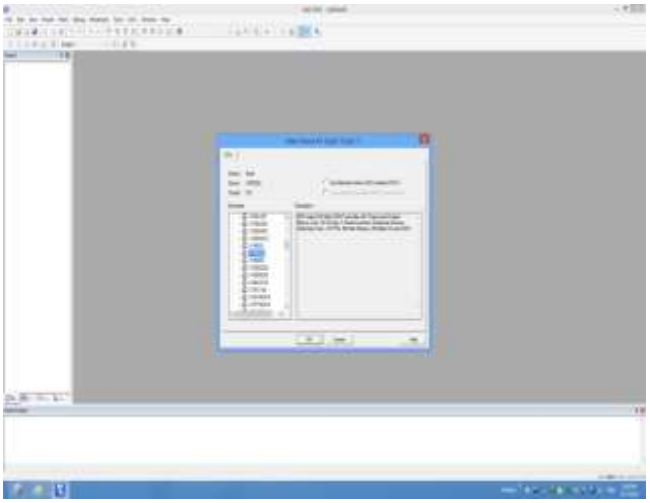

fig2.software window

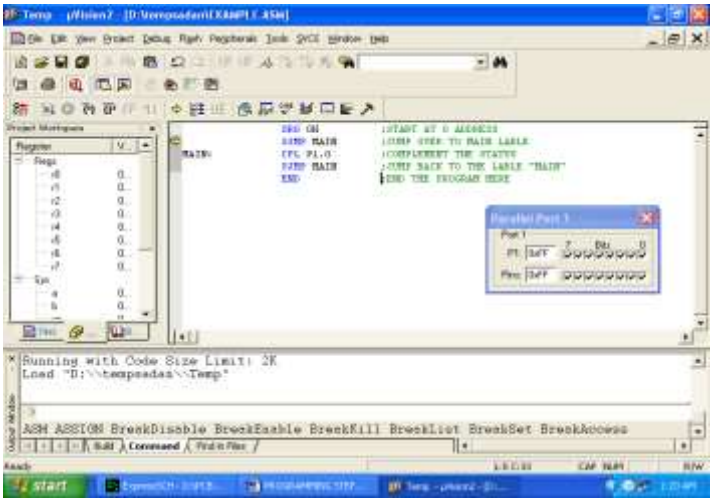

fig3.program code window

A hardware prototype has been developed with the thought of making floor cleaning procedure easy, fast and contented, android mobile application for giving commands

The app shown below is used to send commands to the robot using the bluetooth receiver coupled to it. Bluetooth SPP Manager is an app, which provide communication among two Bluetooth devices. For that reason it uses the RFCOMM Protocol also recognized as Serial Port Protocol (SPP) to transmit data between devices.

fig. 4: android App for transmitting commands

VI.HARDWARE SET UP

fig.4 set up front view

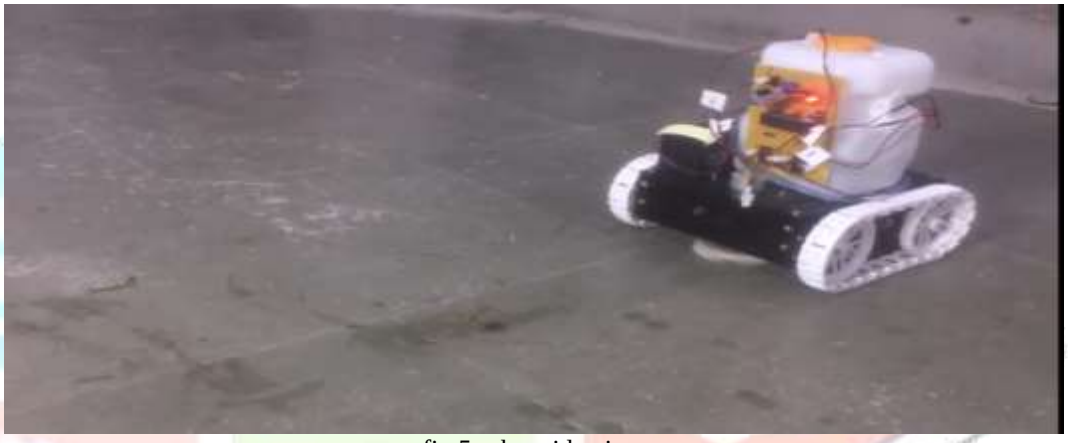

fig.5.robot side view

VII. FUTURE SCOPE

The subsequent shows the advancement that can be completed to improve the automation and thereby provide a improved control on machine and get rid of complete could do with of human involvement:

- Image/video captured of a car/house is fed to the controller so that the robo can clean the complete car/house as per to the input fed.
- The cleaning method on the robot can be replaced by a hand like configuration. So that it can pick up things from one place to another.
- Voice prohibited locomotion of robot instead of remote control.
- Automatic charging.
- Virtual wall-used for maintenance the robot out of selected areas.

VIII. CONCLUSION

The project planned here is an programmed android based floor cleaning machine. The structure is capable of cleaning the floor cleans with a cleaning mop. The system can work without much failure of human physical energy. The method is provided with an android control which uses Bluetooth communiqué. The android application can be used to manage the robot forward, left, right or back. With using the application microcontroller reads the value from the Bluetooth module sends analogous data to the vacuum clean-up robot. To control the robot used Android-device.

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