

Multipurpose Cleaning Robot

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Abstract- Floor cleaning robot is a process which permits floor cleaning by making use of electronic and mechanised control system. The proposed work can be used for programmed floor cleaning of enormous floor in houses and office flooring surfaces. The Robot is designed so that it can be able to reach almost every corner of any room that it should be as compact as possible. The robot is handled using an Android phone with Bluetooth Technology. The robot is made with an Arduino microcontroller at its core. The microcontroller is complemented with marketing communications modules like Bluetooth, motor and brushes to function accordingly. A 12V normal rechargeable battery is employed as electric power supply. The cleaning goal is completed by ongoing motion between a cleaning brush and the floor surface and mopping is performed simultaneously as robot starts off cleaning the floor. Floor cleaning robot will save cost of labour in future. The good thing about Domestic cleaning robot is that it will be affordable and no human intervention is required.

Keywords- Autonomous vehicle, sweeping, moping, ultrasonic sensor, water sprayer, Bluetooth module.

I. INTRODUCTION

In latest years, robotic cleaners have taken essential interest in robotic studies due to their effectiveness in assisting humans in floor cleaning programs at homes, lodges, eating places, places of work, hospitals, workshops and many others. Cleansing robot is a type of mechanical and electrical products for sweeping and dusting. Its miles advanced to a normal vacuum due to the fact it is greater handy to use. The entire cleaning technique would not want a person intervention and it reduces the load at the operation.

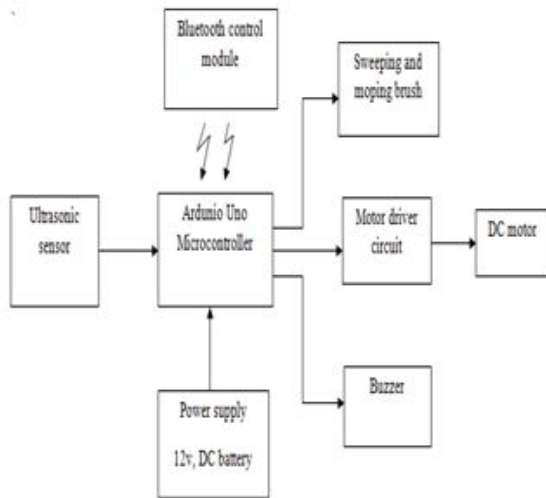
Robotic is an electromechanical system and used for various functions in commercial and home applications. The ground cleaning robotic encompass low energy eating electronic and mechanical parts and it may function all through power outage length and does no longer need any human steering. Robots have electric components which power and manage the machinery. That power comes within

the form of electric power, with a purpose to originate from a battery; a basic electrical circuit performs a critical role right here. The electrical factor of robots is used for movement through motors. Accordingly robots need a few stage of electrical strength provided to their vehicles and sensors in an effort to activate and perform simple operations.

First of all robot begins to transport ahead and carry out cleansing motion. For impediment detection ultrasonic sensors were used. If any impediment detected then robot trade the lane automatically, does no longer prevent and begins cleansing motion. Consequently there is no need to attach wet cloth for mopping, as automatic water sprinkler is placed on the robot which continuously sprays water for moping. Motor motive force circuit have been used to pressure the motors. 4 motors have been used to carry out respected operations like to move the robot, for water pump, for sensing. LM293D IC has been used to drive wheel motor.

The heart of the robot is a microcontroller. A cleaner robot based totally on Arduino UNO has been evolved. Microcontroller is programmed to simply accept inputs to experience boundaries round it and control the robotic to avoid any collisions. This cleaner robotic is an electric home appliance, which fits in manual modes as per the person comfort. It really works on 12V supply. The device operates in far off mode. Far off mode is done with the help of a Bluetooth module, which offers 50m to 100 m range and android telephone. Alerts despatched from distant android phone can be used to control the moves of robotic. The primary concept of this challenge is to manipulate the robot wirelessly with phone. Microcontroller attached with the robotic gets the incoming message from the transmitter and controls the motion of the robot as a consequence. Motors are used for the motion of the robotic. LM293D IC has been used to force wheel motor. Bluetooth module has been used to transmit and receive the sign to operate the robotic through android phone. If any hurdle detected, we will change the route of robotic consequently using the android application.

II. BLOCK DIAGRAM



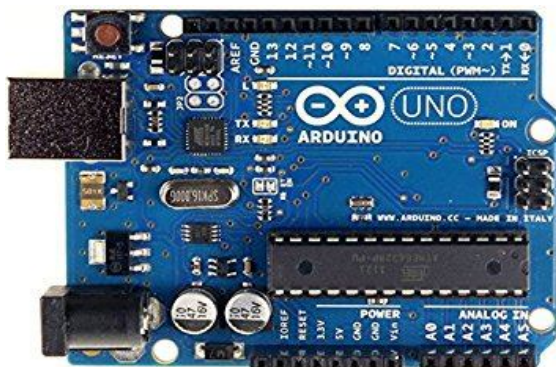
2. Ultrasonic sensor:



An Ultrasonic sensor is a tool which could degree the gap to an item by the use of sound waves. It measures distance through sending out a sound wave at a particular frequency and listening for that sound wave to get better. Ultrasonic sensors are used for the obstruction avoidance since it is the efficient sensor for detecting the limitations.

III. BLOCK DIAGRAM DESCRIPTION

1. Arduino Uno:



The Arduino UNO is a extensively used open-supply microcontroller. “Uno” method one in Italian and is known as to mark the upcoming release of Arduino 1.0. The Uno and model 1.0 might be the reference versions of Arduino, shifting ahead. In a series of USB Arduino boards Uno is the new brand, for an assessment with previous variations and the reference model for the Arduino platform. The Arduino Uno is a microcontroller board based totally at the ATmega328 (datasheet). It has 14 digital input/output pins (out of which PWM outputs uses 6 pins), analog inputs of 6 pins, MHz ceramic resonator of a sixteen pins, connection for USB, a electricity jack, and a reset button, an ICSP header

3. Motor driver circuit:



A motor driving force is a little present day amplifier; the feature of motor drivers is to take a low-cutting-edge control signal after which turn it into a higher-modern sign which could drive a motor. L293D is a typical Motor driving force or Motor driving force IC which permits DC motor to drive on both routes. L293D is a 16-pin IC that may manipulate a hard and fast of DC motors simultaneously in any route. In this manner Motor driving force can control two DC motor with a single L293D IC.

4. Bluetooth control module:



HC-05 Bluetooth module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for obvious wireless serial connection setup. The HC-05 Bluetooth Module may be utilized in a master or Slave configuration, making it a remarkable solution for wi-fi communication.

5. DC Motor:



A DC motor is a type of rotary electric machines that converts electric energy into mechanical energy. To periodically change the direction of current waft in part of the motor, some internal mechanisms either electromechanical or digital are included in most of DC motors,. Maximum kinds produce rotary motion; a linear motor immediately produces pressure and motion in a directly line.

6. Buzzer:



A buzzer or beeper is a signalling device, electromechanical, piezoelectric or mechanical .Of an occasion during switching motion, counter sign or sensor enter the buzzers can be used to alert a person. They may be also used in alarm circuits. The buzzer produces a same noisy sound regardless of the voltage variation applied to it.

7. Sweeping and moping brush:

Brush for sweeping operation is connected in front of the robotic such that as robot starts running the brush begins cleaning the ground. Moping brush is used for cleansing

floors and other surfaces. The moping brush is geared up on the uncommon aspect of the cleansing robot to mop up the dirt.

IV. METHODOLOGY

The block diagram of ground cleaning robot is an integration of electricity (12V), DC battery, Arduino Uno, bluetooth module (HC-05), motors, motor driver LM293D. Arduino uno is energized with 12V power deliver and it's far the core of the robot machine which controls all operations. The Uno is a microcontroller board based at the ATmega328P.

Microcontroller will hook up with a laptop with a USB cable or energized it with a AC-to-DC adapter or battery to get started. Arduino is used because of excessive performance. Bluetooth module provides wireless verbal exchange among android telephone and robotic and its operating variety is 100m. Ultrasonic sensors used for impediment detection. Two motors are used in this device to pressure the wheels. L293D IC used to force the wheel motor all of the signals managed through microcontroller and it takes 12V electricity to work. Bluetooth module is used to transmit and obtain the sign. If any hurdle detected the robot can trade its route using the android applications. Android application is used to govern the entire operation of the robot. Buzzer is a audio signaling tool and offers sound when limitations are detected in the front of the robot.

V. CONCLUSION

The developed floor cleaning robot performs sweeping and mopping operations. This robot works in automatic mode. This proposed robot also offers the obstruction detection in case of any obstacle that comes in its manner. If there is obstruction within the manner of robot, it sends the records to the microcontroller. Then the microcontroller will exchange the route of the robotic by way of supplying necessary indicators to the motor manipulate unit. An automated water sprayer is connected which sprays water for mopping purpose for the convinces of a person. It reduces the wage of labourers and saves time .In computerized mode, the robot operates autonomously. The operations inclusive of sweeping, mopping and converting the path in case of obstructions are achieved mechanically. Moreover, there are new thoughts to enhance the evolved machine and to feature new functionality to it.

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