Automatic Cleaning & Dust Detector Machine for Economical Uses

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Abstract—*In this paper we introduce the new era of electronics which is deals with the Hi-tech Technology known as ROBOTICS. In our work the proposed design robot is use for cleaning the floor by the using of sensors. This proposed work is also deals with the Clean India Project. A new service robot designed for cleaning tasks in home environments is introduced. The System has three subsystem name as Electrical, Software and Mechanical of which Arduino, IR(Infra Rey) sensor , Dust Detector sensor and Motor(DC) are the electrical and mechanical subsystems are respectively and the software subsystem which deals with the coding part in C language in Arduino system, that part of subsystem is behaviors like the brain of our proposed cleaning Robot. The basic components are use in Arduino, Sensor (IR), Motor (DC), Driver IC (L293D) and vacuum cleaner, these are basic component use in cleaning robot. The cleaning robot uses a arduino to detect obstacles and dust particles and it moves towards obstacles and cleans. It is programmed to accept inputs to sense obstacles around it and control the robot to avoid any collisions. In case of obstacles, the arduino control the wheels of the robot by motor driver IC (L293D) to avoid collision. The vacuum cleaner is connected to robot to perform the cleaning process.*

1. INTRODUCTION

In this paper introduce by cleaning robot, cleaning robot is an approach to make cleaning an easy and efficient time at a task complete. These robot have been getting popular in resent year, these robot operate semi-or fully autonomously to perform services useful to the well-begins of humans and equipment. They can clean floors, mow lawns and guard homes and will also assist old and handicapped people.

This paper will focus on a service robot of everyday tools for mankind, a cleaning robot in home. Residential robots are quite different from industrial robots because of nonprofessional users. It needs high reliability and safety.

The functions of a cleaning Robot are:

(1) Detecting the position of the area to is cleaned

(2) Path estimation to reach that position

(3) Cleaning the area with the help of vacuum cleaner which is attached to it.

2. SYSTEM OVERVIEW

A fundamental structure of a modern autonomous dust cleaning robot is complicated, could be illustrated by arduino which is also successful product of commercialization today by iRobot corporation, comprises a housing infrastructure, a motive system with wheels, these robot is self adjusting cleaning head subsystem with brushes and vacuum cleaner assembly, a sensor to detect the obstacle and move the system, these system has complete controlling is autonomous action.

These system are use in arduino board, sensor (IR), motor (DC), motor driver IC(L293D), sharp brush, vacuum cleaner.

When the robot moves in the indoor environment, there are plenty of obstacles around the robot making difficult to find and measure landmarks for correcting position.

That dust cleaning robot is used in IR (Infra Rey) sensor is obstacle sensor this sensor is work on the sense to obstacle and move the robot.

We are use in IC (L293D) this IC is use in drive the motor, this IC (L293D) is also known as motor driver IC the sensor is sense to the obstacle and the IC is help of move the robot.

We are use in the arduino board, arduino board is advance of microcontroller the arduino board is use in run to the program. That robot is connect to the webcamera, webcamera is capture the image and stored and forward to the robot then robot is follow to the dust particles and clean the places.

3. METHODOLOGY

First of all power supply is on then start the system, detect the dust through the dust detector sensor by using webcam. The webcam are captured the image of dust material and save for reference in the secondary storage in the monitor.

The camera keeps capturing image continuously then vacuum cleaner is on and clean the dust particles. We are using object sensor which are generally known as IR Sensor. Which is connected to the arduino. They should be work for sense the object in front. If any object are in front then our robot are turn the left side. Which is possible to programming in the aurdino. We are using two brush in front side which are rounding in opposite direction to adjust the dust in middle area and then vacuum cleaner are clean the dust which are stored in middle area. Now at the end our cleaning robot are going to rich through the any types of dust materials which can be able to clean and wash that dust and germs.
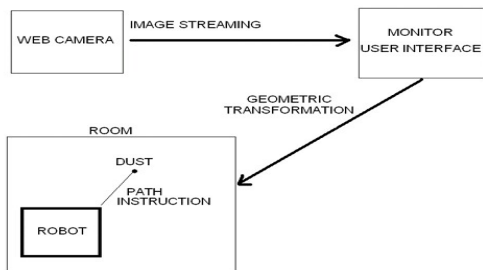

Fig. 1:- image capturing through webcam.

The web camera is capturing the image of the dust particles, the image stored in monitor user interface through the image streaming process then which will be monitored and interface. The stored image is passes through geometric transformation in robot That robot is follow to the dust particles through the path instruction and clean the place. That system will programmed by MATLAB.
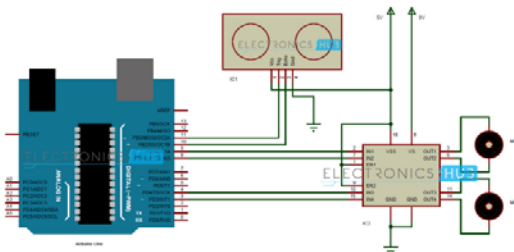

Fig. 2:- circuit diagram of robot

That robot is circuitry very easy. Connect to the component and assemble to robot and task is completed

That robot is connect to vacuum cleaner that work is suck the dust particles and connects to spunch that work is swab the floor. The use of module are

➢ The arduino board is advance of microcontroller the arduino board is easy to burn the program and very easy to use in work. Arduino board is any other task is perform
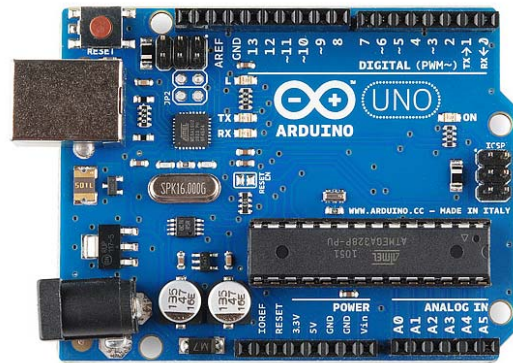

Fig 3:- Arduino Board

➢ The obstacle sensor is work on sense the object then led is on the sensor is use two led transmitter and receiver and VVR(Voltage Variable Resistor) this sensor is active then robot is move and sensor is deactivate then robot is forward condition.

Fig 4:- Obstacle Sensor

➢ The motor is use in wheel the robot, that robot is used in 6 DC motor two motor is used as wheel of robot and two motor is used to two brushes in front of robot and motor is used to one sharp brush is connect under the robot and one motor is connect to a vacuum cleaner

Fig 5:- DC Motor

➢ This is IC(L293D) that IC is motor driver IC the two wheel motor is connect to the IC(L293D) this IC is 16 pin, two motor is connect the pin no is 4,6 and 11,14 in IC and IC is connect to the arduino board
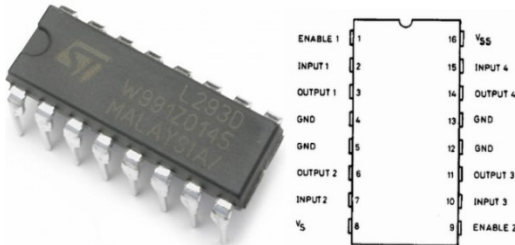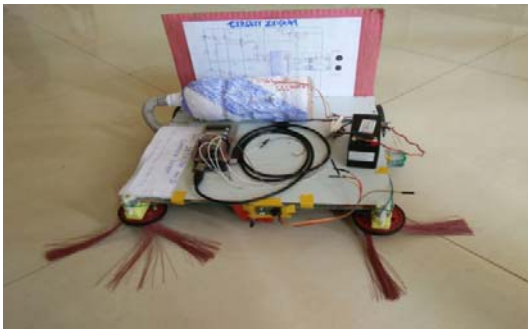

Fig 6:- IC (L293D)

Fig 7:- model diagram of this robot

4. APPLICATION

Cleaning

The robot can easily navigate an area using the camera which is mounted on the roof and with the help of the vacuum cleaner attached to it clean the room.

Security

It can provide security as it constantly captures the image and video and can sense movements it can used to raise an alarm in case an unwanted movement is noticed.

Defense

The robot can keep a check on trespassers in an restricted area on an event of any movement can raise an alarm to alert the forces.

Autonomous playing Robot

The robot can sense the movement and hence can be modified to play games in which an object has to be traced or a ball can be followed.

5. ADVANTAGES

- These robots are worked on automatically.
- We have no need any extra person.
- These robots are sense the dust and clean that automatic.
- It is used to cleaning purpose like home, laboratory, hospital etc.
- Lower power consumption.
- Low cost.
- Which are worked smoothly.

6. DISADAVANTAGES

- This robot is doesn't use in roadway.
- In this robot move with IR sensor because the IR sensor is not properly work in sun rays.
- Webcamra can not measure, what are important and useless type particles.

7. CONCLUSION

It can work automatically and manually a machine can be used anytime and anywhere, it does not get tired and is never busy on labor cost and time, as a single machine can do the work of multiple labors in lesser time this robot (CLEAR) is specially made on the basis of modern technology consumer the paper shows a better and simple approach to provide an overview of design of a simple robotic cleaners control design using gadgets and instrument easily available in market. Clear has all the features which are required for a vacuum cleaner. It has the feature of the scheduling and it can auto drain itself. It can also be used for the industries where cleaning with the help of human is toxic, vacuum cleaner can easily be used. The implementation of clean robot will provide quick clean-up of spills and concentrated messes and it will be easy to use. It can clean in areas with hazardous environments: areas beyond the reach of humans as could be fatal.

8. FUTURE SCOPE

1. This can be used for RTC (Real Time Clock) based system.
2. We are using DTMF (Dual Tone Multiple Frequency) system.
3. We are using voice control to operate this robot.

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