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VACUUM CLEANER USING MICROCONTROLLER

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Abstract: In our paper we have designed a vaccum cleaner using Arduino and IoT. As we know there is demand for automation and robotics, in today's world robots are making the life of humans simpler. There are not many things left in today's world that machine can't do, we have designed a cleaning robot that will be controlled using a Arduino Uno. The system will consist of obstacle detection sensors that will allow the robot to operate without a human efforts and clean. Also it will a control mode using which we can control it via our android phone. The system will connected to the internet using the WiFi module which will help the user to turn on or turn off the machine from remote places. Using IoT we can also keep the records of the on times and off times of the robot. This can help the user operate or monitor the robot from any distance. There are also level sensors that will be provided to the Garbage tank which will notify whenever the garbage tank will be full.

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I INTRODUCTION

We live in an era where people are very busy. People in big cities have long working hours which leaves them with less time for their daily work. For saving the time there is a need an automatic systems for house like cleaning. 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.

Our robot will also be connected to the internet that will help us to monitor and control the robot from a remote distance.

II EXISTING SYSTEM

Cleaning robot is not a new concept in these days. Even each design gives efficient results. Each design has some different manufacturing process; accordingly same advantages and disadvantages too related to specific designs. But all these designs are not human friendly. By reviewing different papers and technique of implementation used for each design we have started working on our design of cleaning robot which is based on PIC controller and working on Bluetooth model. The papers studied for literature review are as follows:-

1. "A TECHNOLOGICAL SURVEY ON CLEANING ROBOT"

Based on Arduino. A large contact sensing material sensors are mounted on the front half of the unit. An omnidirectional infrared sensor at its top front centre. The algorithm used is spiral algorithm. Spiral filling paths cover the area starting from the outside and going towards the center. [1]

2. "DESIGN AND DEVELOPMENT OF FLOOR CLEANING ROBOT"

Based on AT89S52 Microcontroller. RF modules are used for wireless communication between Robot and Human. Robot follows spiral algorithm. UV sensors are used for obstacle detection. Fig 2 : Radiant Power vs Wavelength of IR sensor [2]

3. "BUILDING A MOBILE ROBOT FOR A FLOOR CLEANING OPERATION IN DOMESTIC ENVIRONMENT"

The mechanical design of a cleaning machine for domestic use must be ergonomic and small enough to move

around typical obstacles in a household room, and must be lightweight for easily transportation in case of unexpected problems. Therefore, several different problems have to be solved: the safety, the efficiency of the cleaning element, the configuration of the driving elements, the sensors selection and placement and the battery recharge operation. [3]

4. "STRAIGHT LINE PATH FOLLOWING IN CLEANING ROBOT USING LATERAL ULTRASONIC SENSORS"

The methodology used in this paper is robot follows the straight-line parallel path. The sensors used are ultrasonic sensors. The procedure has been tested in a limited set of cases in unstructured scenarios and some problems have been detected in the presence of rounded objects and some desk chairs.The Beam of the Ultrasonic Sensors Available for Lateral Measurement[4]

5. "A LOCALISATION ALGORITHM FOR LOW COST CLEANING ROBOTS BASED ON KALMAN FILTER"[

Complete coverage for cleaning robots with Low-cost sensors. A coverage strategy with wall-following and cleaning the central area in a roundabout way is proposed. A localization algorithm that fuses data from encoders and of an electronic compass by using a Kalman filter.

III PROPOSED SYSTEM

The system consist of Arduino Mega, a ultrasonic sensor, level sensor, Bluetooth module, WIFI Module, Dc motor drivers and DC motors.

1. **Arduino Mega** is a microcontroller board based on ATMEGA 2560 microcontroller. At has features like 54 digital pins, 4 UART ports 15 analog channel etc. Arduino Mega will be the Heart of the system it will be operating and monitoring.

2. DC motors:

These will 12v 60 rpm dc motors what will be used to drive the robot in different directions.

3. **Ultrasonic Sensor**:

The Ultrasonic sensor will be used to detect the obstacle as can measure the distance it will measure the distance that will help use to detect the obstacle.

4. Level sensor:

Ir Sensor will be used as level sensor which will give signal to the micro controller when the tank will be full.

5. Bluetooth module:

It will be used to receive the commands wirelessly from the android phone to perform the operations

6. Wi-fi Module:

The Wi-Fi Module will be used to connect our system to the internet so that it can be accessed through the internet.

7. Relay:

The relay will be used to operate the vacuum pump that will be controlled by the Arudino Mega.

IV SYSTEM ARCHITECTURE

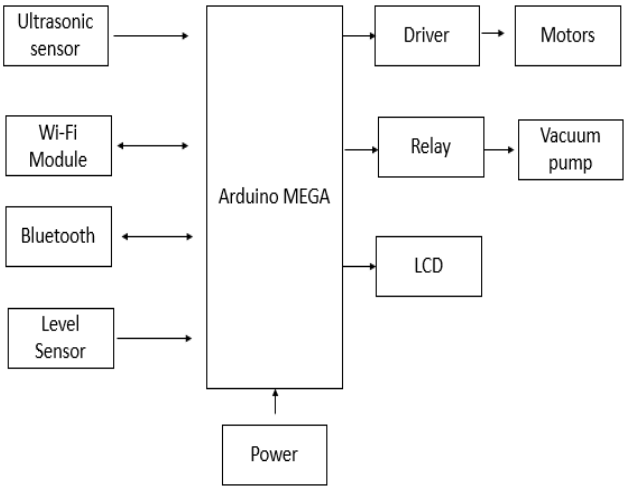

Figure 1 System Architecture

V FLOW CHART

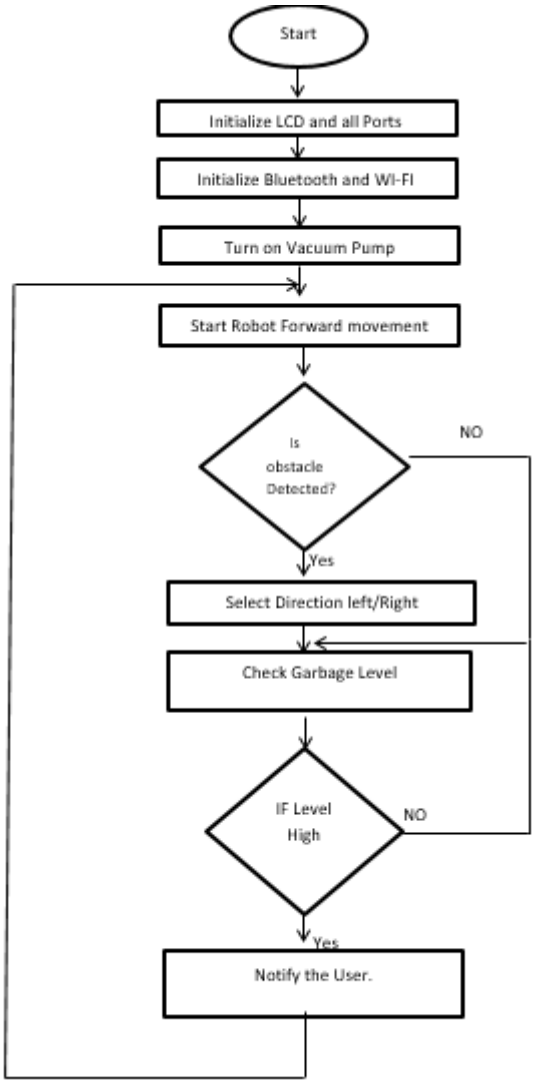

Figure 2: Flowchart

VII ADVANTAGES

- This software is freely available.
- Low Cost and Easy to use.
- Data can be accessed from any part of the world.
- Easy to Design.
- Reduces human efforts.

VII CONCLUSION

In This paper, we have designed a system that can automatically clean homes without any human interference and also can be accessed from remote places using internet.

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