



Robotic Vacuum Cleaner

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Abstract:

As the technology is going in advance, the research in robotic science is growing rapidly for the convenience of the human life. The main aim of this paper is to design a robotic vacuum cleaner which can be controlled by android phone for sucking up dust and dirt, usually from floors and from other surfaces such as upholstery and draperies.

Keywords: Vacuum cleaner, Smart phone, Bluetooth, Microcontroller, Display

1. INTRODUCTION:

Robots are smart machines that can be programme and used in many areas such as manufacturing, industry, etc.

The idea behind this research is to exploit robotics usage in the household work. This vacuum cleaner is designed to make cleaning process easier for human task. This project is a combination of hardware and software which has microcontroller an Android application and Bluetooth module

A robotic vacuum cleaner is an autonomous electronic device that is programmed to clean a specific area through a vacuum Cleaning assembly. Some of the available products can brush around sharp edges and corners while others include a number of additional features such as wet mopping. In 2002, Robot launched its first floor cleaner robot named Roomba; Roomba uses the IR and RF technology.

2. DESIGN METHODOLOGY:

The present robot is designed to be controlled by Android phone. It mainly consists of MCU, Bluetooth, LCD, Motors, Ultrasonic sensor. Robot is controlled by the android app with four functioning's which can be performed by this ;That are moving towards front, back, left and right.

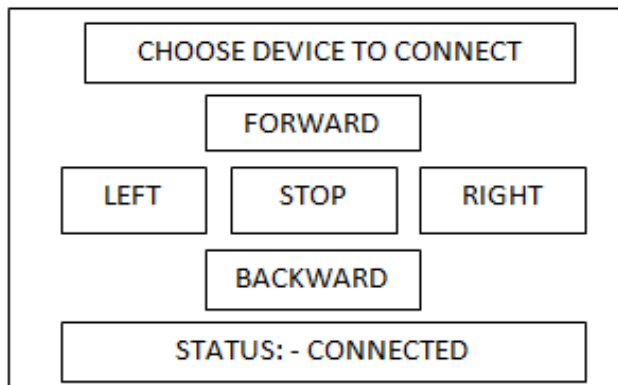


Figure.1.Application Display

3. BLOCK DIAGRAM:

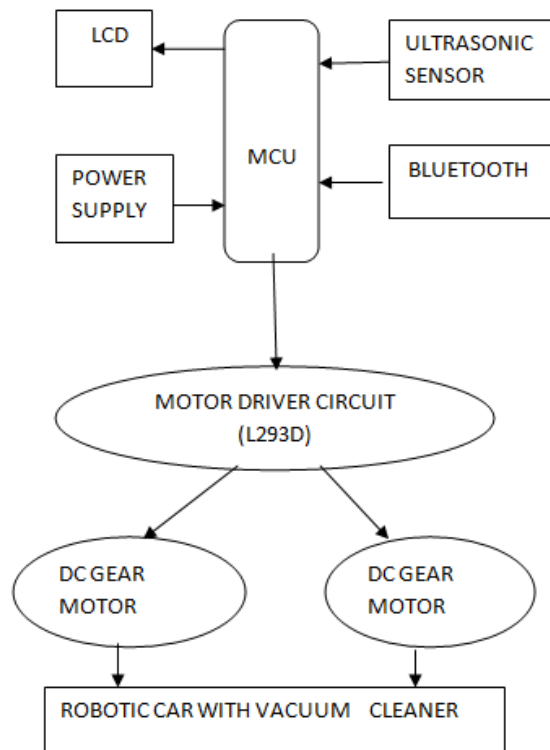


Figure.2.Block diagram of the proposed system

3.1 Regulated Power Supply: - Power supplies are designed to convert high voltage AC mains to a suitable voltage supply for electronic circuits.

3.2 DC Source (Battery) :- An electrical battery is one or more electrochemical cells that convert stored chemical energy into electrical energy. The battery consists of several electrochemical cells connected in series to provide the voltage desired.

3.3 MCU (ATMEGA8): The ATMEGA8 microcontroller is manufactured by the ATMEL. ATMEGA8 is a low pressure CMOS 8 bit microcontroller based on the AVR RISC

architecture by executing powerful instruction in a single clock cycle, the ATMEGA achieves through puts approaching IMIPA per MHZ , allowing the system designed to optimize power consumption versus processing speed.

3.4 LCD: LCD which is used in the system is LMB162A . The main features of this LCD are 16X2 displays, intelligent LCD, used for alphanumeric characters and based on ASCII codes.

3.5 Bluetooth: It is a wireless communication protocol running at the speed of 2.4GHZ. It is designed for devices such as mobile phones. Bluetooth protocol uses the MAC address of the Bluetooth gives the connectivity between two devices using their MAC address.

3.6 Motors: A gear motor is a type of electrical motor. It uses the magnetism induced by an electrical current to rotate a rotor that is connected to shaft. The energy transferred from the rotor to a shaft is then used to power a connecting device.

3.7 Ultrasonic Sensor: This sensor is high performance ultrasonic range finder. Its range is 2 cm to 4 cm. It is connected directly to the microcontroller and distance can be measured. It shows the value on the LCD connected on robot and also in android application.

4. WORKING

This is a smart phone android operate robot. This robot is controlled by using Bluetooth module HC - 05 and motor. In this, android application is used and this application send and microcontroller move the robot accordingly by controlling the gear motors. Ultrasonic sensor used to detect the obstacle in the path of robot .Sensor detects the obstacle distance and show the value on the LCD connected on robot and also in the android application.

5. CONCLUSION:

The product thus developed is fully operational and gives desired motion. It is being tested in a room which results in successful outcome. The scrubber design should be modified in future because the current design has few problems. Few of those are the motor is not detachable and the high rpm leads to vibration of the whole system. If these features will be modified, this will work well. In our case 2 vacuum pumps are used which leads to loss of power. This can be reduced by substituting these 2 pumps with one pump having 2 path ways. This will be the next development stages. This not only decreases cost but also increases reliability of the instrument. Overall the concept is very much helpful and there is scope of a lot of development in mechanical parts. The optimization will continue till achieving the best one. Overall the project is successful to its intent and will definitely change the era robotics and floor cleaning. In the automation part the algorithm are designed to give 90% efficiency which is too high in current scenario. The development can be made in the field of sensing. But this product has the capability to detect as well as move in the direction of dust and thus resulting in better cleaning of floors. As a whole this is a successful product developed that can be used in current Indian house-hold.

6. REFERENCES:

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