International Journal For Technological Research In Engineering
Volume 4, Issue 8, April-2017 *ISSN (Online): 2347 - 4718*

ANDROID BASED AUTOMATIC FLOOR CLEANING ROBOT

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Abstract: This paper presents the technological advantages that would help in daily chores of cleaning. For the convenience of most of the people who are extremely busy in there chores, the need of the project has come up. So this has resulted in coming up with an objective of making an automated cleaning machine. The paper comprehend of automated cleaning machine which having components to DC motor operated wheels, roller brush and cleaning mop. The technology has been used keeping in mind the economic perspective. In existing system there was no provision for obstacle detection. So here in this system ultrasonic sensor is used for obstacle detection and using microcontroller it moves back and turn to left.

I. INTRODUCTION

Household cleaning is a repetitive task carried out by number of people every day. Hence there is a need of bringing revolution in the area of science and technologies, which could help easily in repetitive tasks which we perform daily. And also giving consideration to the intensity of labour required and improving qualities to its optimum level [2].Here we had designed a cleaning machine is operated using smartphone. A Smartphone is a mobile phone built on a mobile computing platform, which ha smore advanced connectivity and computing ablility than what a feature phone has [1]. An implication on cleaning machine was done by using various techniques such as using Rasp-berry Pi, Arduino ,PIC controller and so on. Every implications has it's advantages and linitations too. On the basis and study of those limitations new inventions are carried out [3]. Here in this project we are using 8051 Microcontroller.The innovation in this project is obstacle avoidance and conrol using android app via Bluetooth. Here we are using sensor to detect obstacles. The cleaning machine uses a microcontroller to detect obstacles and manipulates its direction as per the input from ultrasonic sensor mounted in front and the machine would stop automatically.

II. PROPOSED CONCEPT

The Project that is being presented here is a complete autonomous android based machine. It is capable of cleaning the room with just a little human interaction and all the mechanisms work simultaneously. The main purpose of our project is to support the "Swachh Bharat Abhiyan" initiated by our honorable Prime Minister Mr.Narendra Modi.

General Specfications:

- Battery operated floor cleaning machine .
- Requires little human intervention.
- Convenient product that can be used to clean the room without much physical effort.
- Saving person valuable time.
- All mechanisms work simultaneously.

The following figure shows the power supply that is being provided to different circuits as per their requirement,

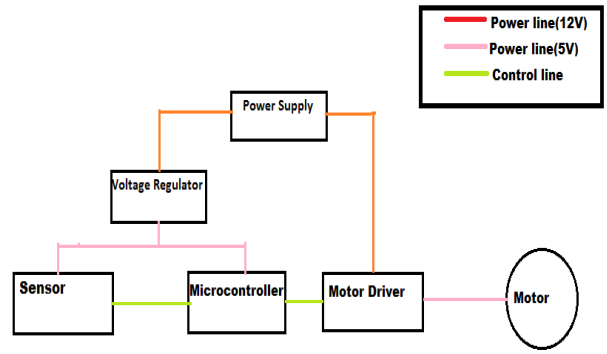

Fig 1:Power Supply

We had used the microcontroller from the family of 8051.The P89V51RD2 is an 80C51 microcontroller with 64 kB Flash and 1024 Bytes of Data RAM [4]. Almost every mechanical movement that we see around us is accomplished by an electric motor. To control the wheels and driving of mop and broom we had used L293D motors. The L293 and L293D are quadruple high-current half-H drivers. The L293 is designed to provide bidirectional drive currents of up to 1A at voltages from 4.5 V to 36 V [5]. Bluetooth is a wireless communication protocol running at the speed of 2.4 GHz with the architecture of client-server and which is suitable for forming personal area networks. It is designed for devices such as mobile phones (low power). Bluetooth is the only appropriate communication protocol because there is no fear of getting the frequency interference. Bluetooth protocol uses the MAC address of the device. Bluetooth gives the connectivity between two devices using their MAC address. The \ connectivity between the hardware and] software is via Bluetooth chip. HC-05] module is an easy to use Bluetooth SPP (Serial Port Protocol) module designed for transparent wireless serial communication setup [6].

As we had said that the most interesting feature of our project is ultrasonic sensor ,so the sensor that we had used is ultrasonic ranging module:HC-SR05[7].In our case we had reduced the ranging distance to 50cm so that it can clean maximum area.

Specifications:

- Power supply : 5V DC
- Quiescent current < 2mA
- Effectual angle < 15
- Ranging distance : 2cm-500cm
- Resolution : 0.3 cm

Various components that from the building blocks of our project is as below:

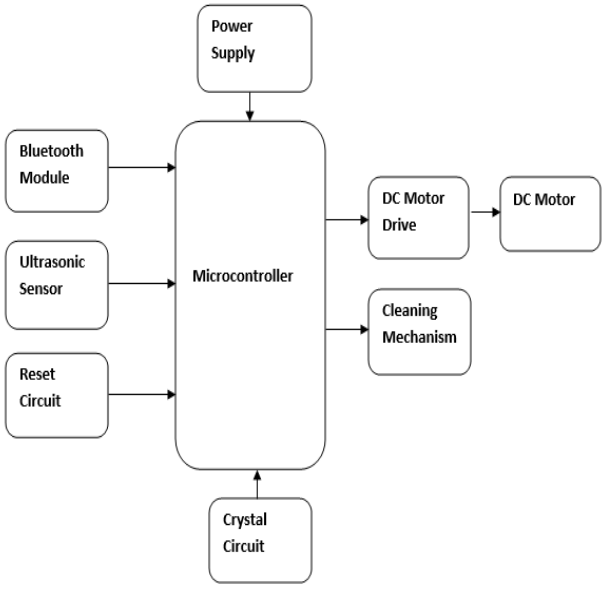

Fig 2: Block Diagram

The microcontroller is the brain of our system that takes all the decision as per the inputs that are provided to him from the components like Bluetooth module, ultrasonic sensor and so on. The DC motor is connected to the microcontroller via DC motor driver and our cleaning mechanism consists of mop and broom that does dry cleaning. The heart of our system is crystal circuit, and the operation speed of machine is dependent on the frequency provided by the crystal. The crystal circuit provides he frequenct of 11.0592 Hz. In some case a situation may occur that demands resetting the complete ciruit for this the reset circuit is used. Our machine is a prototype an this is how it looks,

III. FUTURE SCOPE

The following shows the advancement that can be done to improve the automation and thereby provide a better control on machine and eliminate complete need of human interventaion:

- Image/video captured of a car/house is fed to the controller so that the robo can clean the entire car/house according to the input fed.
- The cleaning mechanism on the robot can be replaced by a handlike structure.so that it can lift things from one place to another.
- Voice controlled locomotion of robot instead of remote control.
- Automatic charging.
- Virtual wall-used for keeping the robot out of designated areas.

IV. CONCLUSION

The project proposed here is an automated android based floor cleaning machine. The system is capable of cleaning the floor cleans using a cleaning mop. The system can work without much loss of human physical energy. The system is provided with an android control which uses Bluetooth communication. The android application can be used to control the robot forward, left, right or back. By using the application microcontroller reads the value from the Bluetooth module sends corresponding data to the vacuum cleaning robot. To control the robot used Android-device.

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