

A Review on Design of Automated Floor Cleaning System

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Abstract—This study has presented a comprehensive overview of the technological advantages helped in the real life various. For the convenience of most of the people who are extremely busy in there chores. The need of the project has come up because of a busy schedule of a working in a corporate sector. So this has resulted in coming up with an objective of making a automated vacuum cleaner. The study comprehend of automated vacuum cleaner which having components to DC motor operated wheels, roller brush, cleaning mop, the garbage container and obstacle avoidance sensor. A 12V rechargeable battery is used as power supply. Other than this is compresses of special technique of UV germicidal cleaning technology. The study has been done keeping in mind economic cost of product.

Keywords-UV germicidal, obstacle avoidance sensor, Dcmotor, IR sensors, ATmega16.

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.

There are already several big bulky floor cleaning machines available in the market which are not capable of cleaning the remote areas which are not in the reach. The need of designing a new technological based vacuum cleaner, which could overcome the short coming of existing vacuum cleaner. And also comprehending of new addon facilities vacuuming, mopping, sanitizing the floor using UV light.

The study is more focused towards the economi scale and better sensors technology for avoiding collision with obstacles, navigating its own path and making the vacuum cleaner functionally more compitant i.e doing various functions of floor cleaning like vacuuming, mopping and soaking at the same time.

II. History

In this section, a quick survey of the principal milestones that characterize the Robotic vaccum cleanerhistorical evolution is proposed.

Before vacuum cleaners existed, people had to take their carpets outside and beat the dirt out of them. Some people cleaned their carpets only once a year during the spring. (The dust mites must've loved that!)The first vacuum cleaner, the "Whirlwind," was invented in Chicago in 1868 by Ives W. McGaffey.

In the late 1990s and early 2000s, several companies developed robotic vacuum cleaners, a form of carpet sweeper usually equipped with limited suction power. Some prominent makers are Roomba, Neato, bObsweep among others. These machines move autonomouslywhile collecting surface dust and debris into a dustbin. They can usually navigate around furniture and come back to a docking station to charge their batteries, and a few are able to empty their dust containers into the dock as well. Most models are equipped with motorized brushes and a vacuum motor to collect dust and debris. While most robotic vacuum cleaners

are designed for home use, some models are appropriate for operation in offices, hotels, hospitals, etc.

The Dyson robotic vacuum cleaner (DC06) was too expensive for home use, due to its high technical specifications. Thus, it was never released, although it is claimed that it would have been the first robotic vacuum cleaner sold.

In December 2009, launched the world's first robotic vacuum cleaner which uses a laser-based range-finder to scan and map its surrounding. It uses this map to clean the floor methodically, even if it requires the robot to return to its base multiple times to recharge itself. In many cases it will notice when an area of the floor that was previously inaccessible becomes reachable, such as when a dog wakes up from a nap, and return to vacuum that area. It also has the strongest impeller among robotic vacuum cleaners, pulling in 35CFM of air.

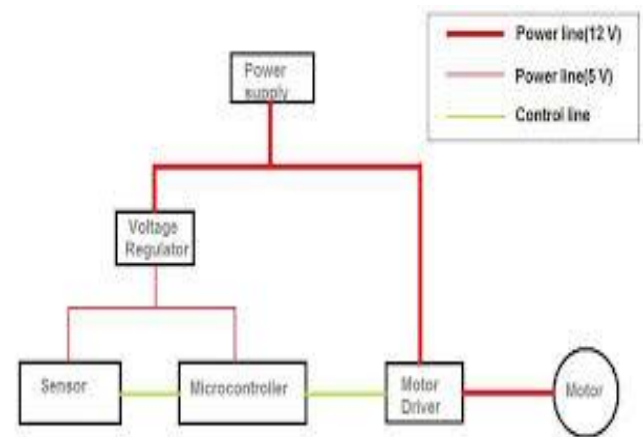
III. Proposed concept

It is a complete autonomous system that work by itself; IR sensors are used to avoid collision with an obstacles. This robot capable of vacuuming the floor of room without any human interaction other than just starting the system. All mechanisms work simultaneously.

General specification:

- Battery operated floor cleaning system
- Without any human interaction
- Cheap
- Convenient product that can be easily used to clean a room on its own
- Saving a person valuable time.
- Simultaneous working of all mechanism

System block diagram:



Block diagram in brief:

Microcontroller ATmega16The microcontroller is the heart, which makes the system automatic. The microcontroller reads the signals from the IR sensors and the digital signal processor. It then processes this data and controls the movement of robot by giving signals to the motor driver.



Motor driver circuit:

A motor driver is used to control the two geared DC motors. It can make a motor rotate in either clockwise direction or in anti-clockwise direction according to the control inputs given to it. The microcontroller provides the control signals to the motor driver IC according to the output of IR sensors in automatic mode.

IR sensors:

An astable multivibrator, an IR LED and an IR sensor TSOP1738 constitutes the IR sensor block. Here we use four pairs of IR LED and sensor for the automatic

operation of the House Cleaning Robot. The multivibrator is set to produce square wave oscillations at a frequency of 38 kHz[2]. The output of the multivibrator drives the IR LEDs. When an obstacle comes in front of the robot, the IR rays get reflected from the obstacle and fall on the IR sensor, which turns the normally high output of sensor to off. It controls the movement of robot according to the output of the IR sensors.

DC power unit

This block consists of a 12 V rechargeable battery and a voltage regulator. The LM7805 IC connected to the output of the battery, provides a constant output of 5V[2] regardless of the load in the circuit. Thus the power requirements of the system are strictly met without putting the system at risk during high loads.

IV. Conclusion:

This design of Automated floor cleaning system can be used to clean any kind of remote places. As the motors selected can consume much less power so it will be the power saving and cost saving too. Also there is a need of a vacuum cleaner which operates automatically. As well as provides new additions of sanitization of floor using UV lights & multiple functioning in one time of operation.

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