



MANUAL/AUTOMATIC FLOOR CLEANING ROBOT

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MANUAL/AUTOMATIC FLOOR CLEANING ROBOT

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ABSTRACT

A floor cleaning robot embedded with ARDUINO microcontroller has been developed. The cleaning robot is an electronic house appliance, which is capable of being operated in two different modes according to the convenience of the user i.e, "Automatic and Manual". It performs waste paper collection dust collection and mopping operations. Undetachable mop is fixed to the back of the robot for mopping. The robot works on 12V(volts) lead acid battery supply. In automatic mode, all the tasks are performed by the robot itself. Initially, robot starts and moves forward to perform cleaning action. It follows a predetermined path. Bluetooth module has been used for wireless communication between robot and the user in automatic and manual operation. Bluetooth module has range of 3cm -3m range. In the automatic mode a predetermined path can also be embedded into the robot according to the dimensional coordinates of the room or can be guided through ultrasonic readings. Five motors are used to perform respective tasks viz., to move the robot and for the rotation of mop. L293D IC is used to drive wheel motors and waste paper collector motor. All the activated commands are displayed on LCD. In the manual mode, commands are given by the operator (user) to the robot. Bluetooth module(HC-05) is used for wireless communication to transmit and receive the signal between the robot and mobile.

INTRODUCTION

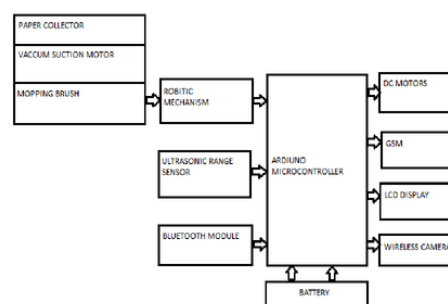
Cleaning and sanitization helps in protecting the health of human beings from different allergies and diseases. The shelf life of floor is improved by regular cleaning and maintenance. Effective cleaning depends on the type of cleaning and techniques employed. Cleaning of floor through

traditional methods is a challenging task. Hence the present is aimed to design a cleaning robot which can be operated in manual and automatic modes according to the convenience of the user. This work is aimed at satisfying the cleaning of a household environment.

ENVIRONMENTAL CONSIDERATIONS

The constraints imposed for a house (or apartment) are fairly obvious. One consideration results directly from the vacuum cleaning task. Low-profile obstacles such as extension cords, throw rugs and newspapers may not block the robot's path, but could jam the vacuuming system. The presence of humans and their pets makes things more interesting. "Guest" adults may be unfamiliar with the robot. Children will attempt to ride upon, mislead or otherwise play with the robot. Infants will be inattentive and especially vulnerable. Pets may attack the robot, or perhaps just block its path. TVs, stereos and children will generate a high ambient noise level. Unfortunately, it must also be expected that objects will be dropped on, and liquids will be spilled upon the robot.

BLOCK DIAGRAM



CONCEPT USING L293D

L293D is a motor driver IC and works on the concept of H-bridge. H-bridge is a circuit that allows voltage to flow in either direction, to rotate in clockwise or anti-clockwise direction. L293D IC's are ideal for driving DC motors. Inside L293D IC two H-bridges are present to drive two motors independently.

ARDUINO MICROCONTROLLER

ARDUINO is an open source hardware development board used for project purpose. The projects developed using the microcontroller are licensed under the (LGPL) Lesser General Public License. Arduino boards are available commercially as DIY (do it yourself) kits.

BLUETOOTH MODULE

HC-05 is a Serial Port Protocol (SPP) Bluetooth module. The module is used to establish a wireless serial communication between two devices. The module can be used in either Master or Slave configuration. The module is majorly employed in embedded system and robotics projects.

GSM MODULE

GSM/GPRS module is a hardware device which is used for message communication purpose in projects.

A GSM/GPRS modem can perform following operations:

1. Receive, send or delete SMS messages in a SIM.
2. Read, add, search phonebook entries of the SIM.
3. Make, Receive, or reject a voice call.

LCD DISPLAY

A liquid-crystal display (LCD) is an output hardware device used to display the activated commands, modes etc for the understanding of the user.

ROBOTIC MECHANISM

An algorithm is given to the microcontroller by the user for the robot to follow the commands and perform the specific operation.

WIRELESS IP CAMERA

IP camera is a type of wireless video camera commonly employed for surveillance purpose. In this project the IP WEBCAM mobile app is utilised to have a clear visual of cleaning robot on mobile.

EQUIPMENT (PROTOTYPE)



RESULTS AND DISCUSSION



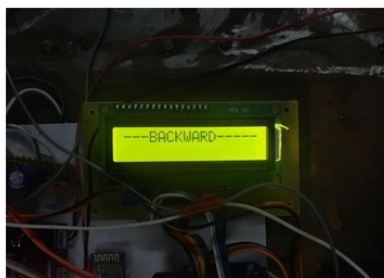
1.) Display when the robot is switched "ON".



2.)Forward movement activation display.



6.)"STOP" display when command is activated.



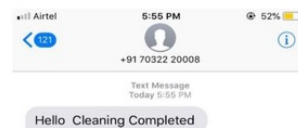
3.)Backward movement activation display.



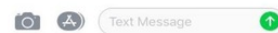
7.)"SELF CLEANING" when automatic mode is switched on.



4.)Right turn activation displayed.



5.)Left turn activation displayed.



8.)Message received on mobile through GSM MODULE.

CONCLUSION

The cleaning robot is capable of performing three tasks viz., vacuum suction, mopping and paper collecting. All these tasks are performed in either manual mode or automatic mode according to the convenience of the user.

ACKNOWLEDGEMENT

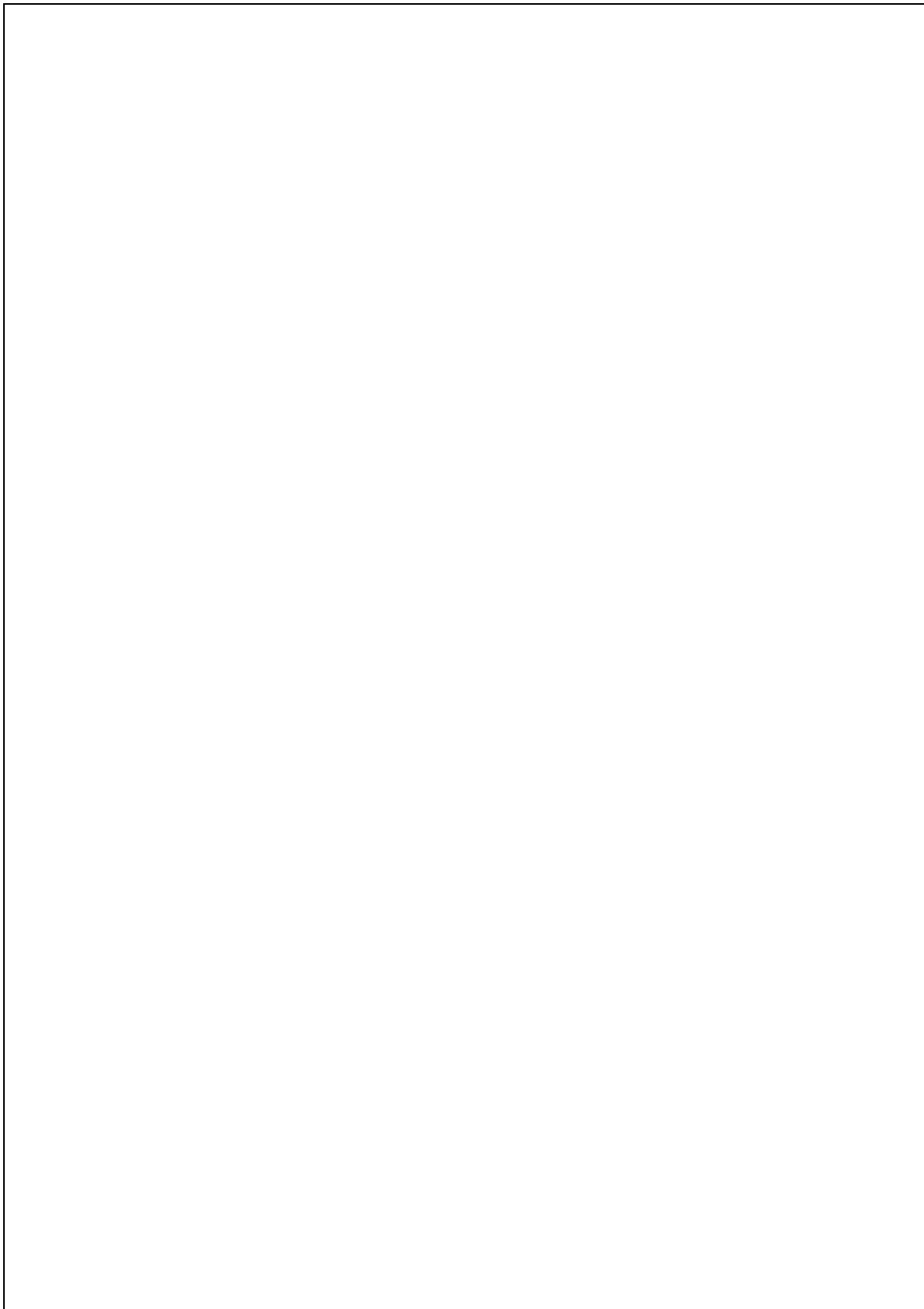
We have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals. We would like to extend our sincere thanks to all of them.

We would like to take this opportunity to express our inapt gratitude towards Mrs A.Suvaramma for her constant support and guidance throughout the conception and the development of this project. Furthermore we would like to acknowledge the support extended to us by our Project Coordinator Mrs. Kayalvizhi who has reiterated on the working of the report from time to time and given her invaluable feedback.

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