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SOLAR POWERED ECO FRIENDLY VACUUM CLEANER CUM FLOOR MOPPING ROBOT

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ABSTRACT

This project presents the design of Solar powered Vacuum Cleaner cum Floor Mopping robot which runs on battery and is operated by mobile application and uses machine learning algorithms to clean. This smart vacuum cleaner cleans both dry and wet floor as well. Its main objective is to maintain and keep our surroundings clean. Thus this system allows for fully automated mopping system without the need for any human intervention. The robot is built to help in daily cleaning tasks and simplify it. It brings together both dry and wet cleaning operations using a vacuum cleaner as well as wet cleaning brush. The robot is controlled by a Blue Tooth Mobile Application. The Blue Tooth Terminal (BTT) App is used by user to send movement commands to the robot. The robot consists of an BT receiver circuit to receive movement commands and operate the motors to achieve desired movement. The robot uses a battery that is constantly charged by a solar panel as it is drained by the motors. This provides a longer battery life when it is exposed to sun rays. The system consists of a vacuum cleaner with added ultrasonic sensor for obstacle detection. Thus the robot does not bump into any obstacle. The robot is integrated with a water tank that sprays water in front of robot which is followed by 2 brushes to clean the floor surface.

Keywords: Solar energy, Floor cleaning mechanism, Airdryer, Garbage collector etc.

1. INTRODUCTION

Cleaning machine is very much useful in cleaning floors and outside ground in hospitals, houses, auditorium, shops, bus stands and public place etc. In modern days interior as well as outside cleaning are becoming an important role in our life. Cleaning of waste is a very important one for our health and reduces the man power requirement. Many of floor cleaning machines are available but we developed machine is very simple in construction and easy to operate.

Anybody can operate this machine easily. Hence it is very useful in hospitals, any large area space. The time taken for cleaning is very less and the cost is also very less. Maintenance cost is less. Much type of machines is widely used for this purpose. In our project we have made the machine to operate in a fully mechanical way with a little amount of electrical components. The Floor cleaner is of very simple construction and is very easy to operate, anyone can operate it without any prior training of any sorts with safety. It is very important one in any hospitals, hotels, bus stands

2. DESCRIPTION

This project is an autonomous vacuum cleaner that will allow the user to the ability to clean floor with

minimal effort. Unlike other robotic floor mopers on the market, this design requires no perimeter wires to maintain the robot within the room. Through an array of sensors, this robot will not only stay on the floor, it will avoid and detect objects and humans. This design is still in the prototype stage due to financial and time constraints. Documentation includes all major design aspects. This project will continue in hopes to market the design. In the time where technology is merging with environmental awareness, consumers are for ways to contribute to the relief of their own carbon footprints. Pollution is manmade and can be seen in our own daily lives, more specifically in our own homes.

This project of a solar powered automatic vacuum cleaner will relieve the consumer from moping their own floors and will reduce both environmental and noise pollution. This design is meant to be an alternate green option to the popular and environmentally hazardous gas powered cleaners. Ultimately, the consumer will be doing more for the environment while doing less work in their daily lives. The hope is to keep working on this project until a suitable design can be implemented and then be ultimately placed on the market.
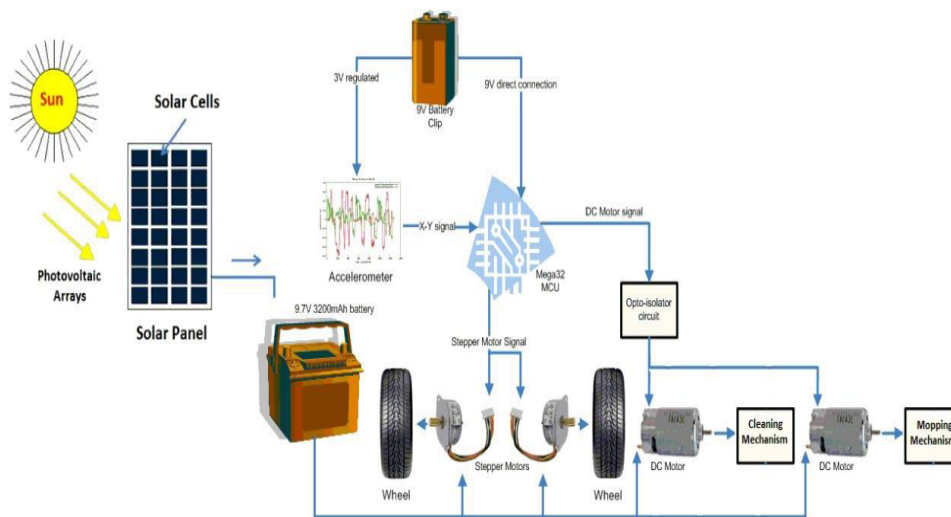

Figure: MAJOR COMPONENTS OF SOLAR POWER VACUUM CLEANER CUM FLOOR MOPPING ROBOT

Determining where to place our sensors is crucial to the overall effectiveness of our design. Initially, we knew to place the humidity sensor facing down into the ground. The solar panels were to be placed horizontal on the robot because to achieve maximum sun exposure. The microprocessor must be in the robot to protect it from the natural elements. Our ultrasonic sensor will be mounted directly in front of the robot for maximum detection. The only sensor that will be angled is the PIR because it needs to detect humans and since the robot is at ground level it must be facing up to effectively detect humans. Our preliminary design is shown in
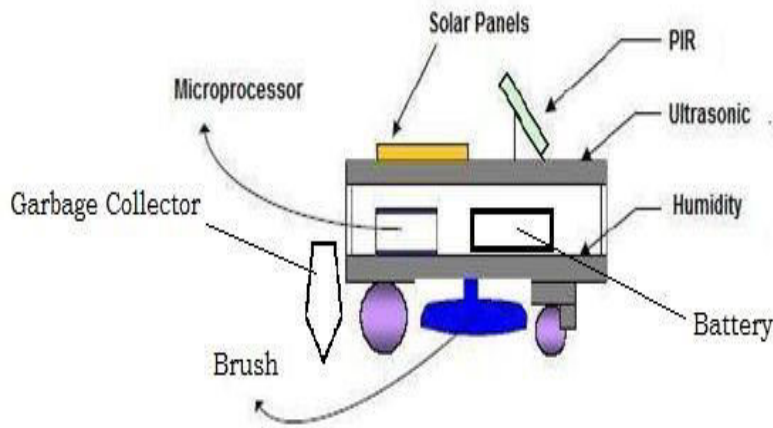
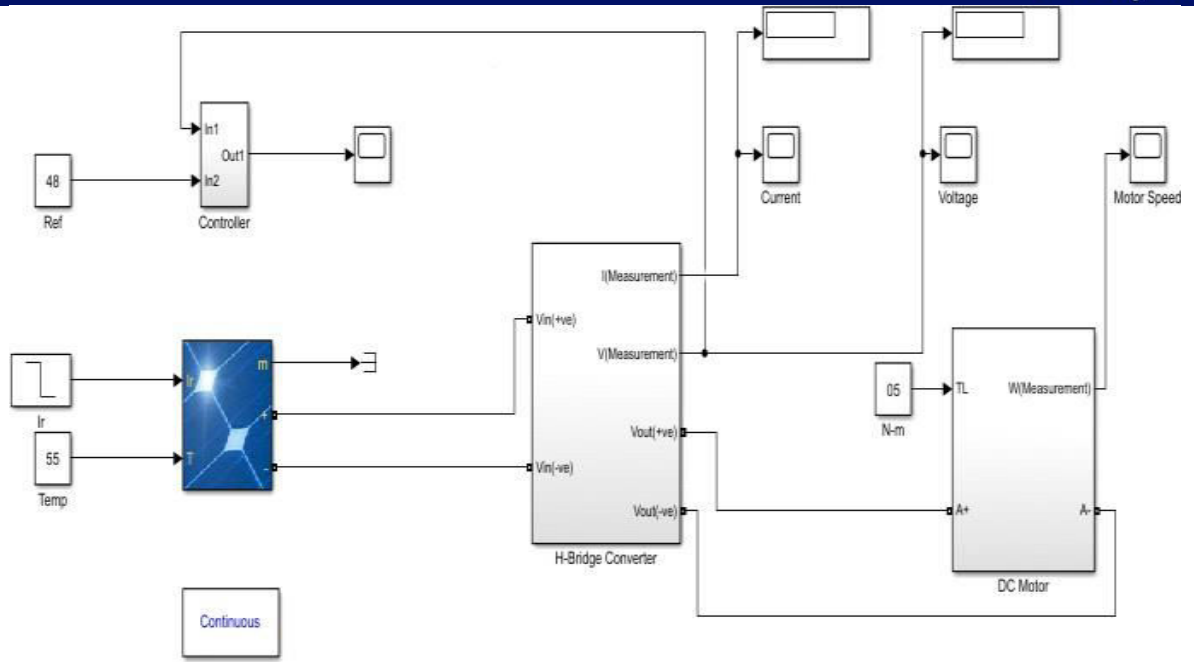## 3. HARDWARE DESIGN
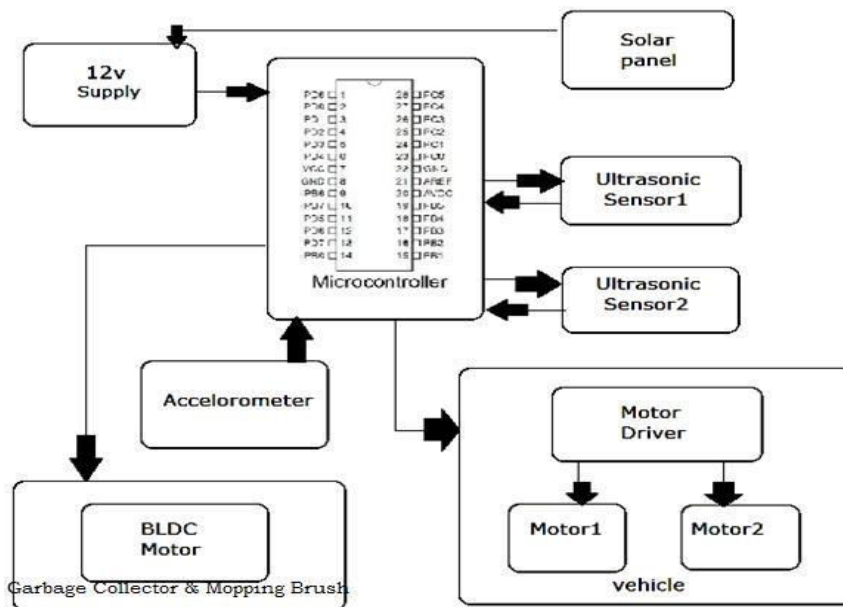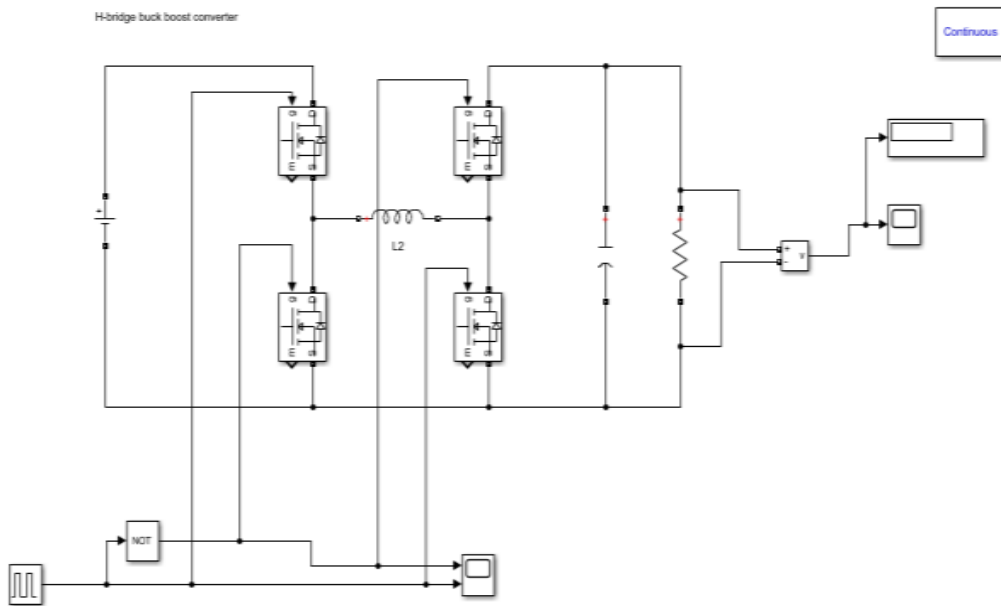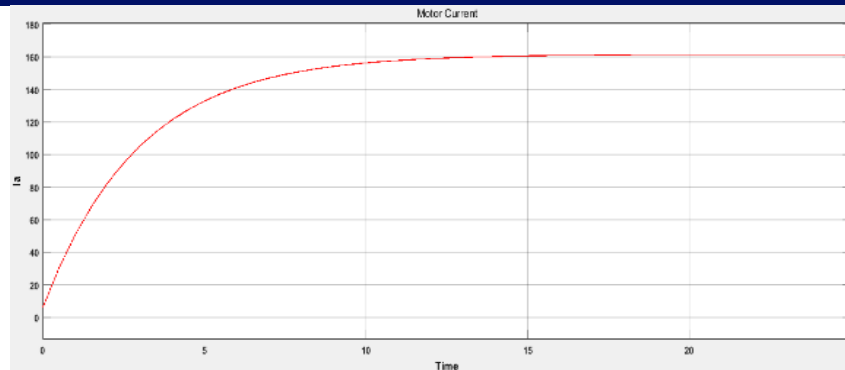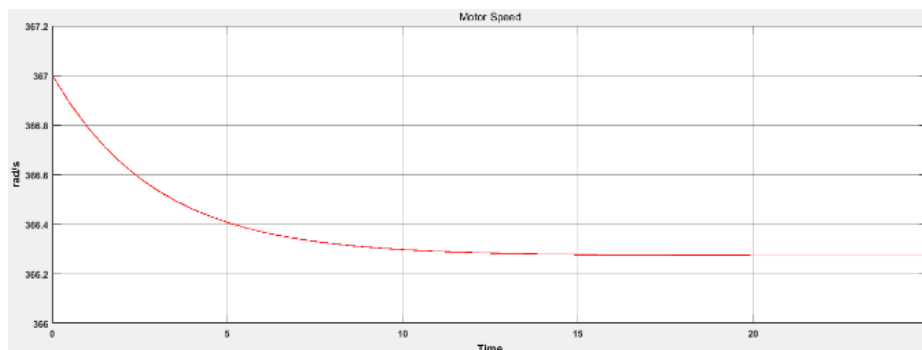

SIMULINK MODEL AND RESULTS

Figure: Simulink Model of the Proposed System

Simulink Model of the H-bridge converter System

Current drawn by the motor

Speed of the motor

CONCLUSION

The proposed system is efficient in terms of cost, time and management. Its user - friendly feature enables us to access it from any place through the mobile application. Compared to the existing systems, it has higher efficiency by overcoming the drawbacks as mentioned in the previous slides. Therefore, it is a well proposed system that can be implemented in households and office environments.

The project aims on developing a vacuum cleaner that is very efficient for both dry and wet cleaning. The vacuum cleaner has a suction pump which collects the dust present on the surface. The vacuum cleaner has IR sensors present on its sides which help in avoiding collisions with obstacles. It is both battery and solar panel equipped which acts as a source of electricity. The vacuum cleaner is controlled through an android application and can be accessed from any place. The raspberry pi module and camera is used for capturing the floor.

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