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Automatic Solar Grass Cutter

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Abstract: In present generation grass cutter machines are becoming very popular today. Pollution is manmade, which we can be seen in our daily life. In old model of grass cutter IC engine was used and hence because of its environmental impact, pollution level rises. IC engine driven cutter is more costly. Maintenance of such conventional machine is more. To avoid these drawbacks, we plan to build new type of grass cutter which runs on solar energy and this model is economical compared to previous one. The aim of our project is to make the grass cutter which operates on solar energy, hence save the electricity and reduces manpower. In this project we use 8051 microcontroller for controlling the operations of a grass cutter. Also the grass cutter has Ultra sonic sensor for obstacle detection. Grass cutter operates automatically hence it does not require skilled person to operate.

Keywords: solar power, microcontroller, solar energy, ultrasonic sensors, motors,

I. INTRODUCTION

The fully automated solar grass cutter is a grass cutting robotic vehicle powered by solar energy that also avoids obstacles and is cutting the grass without the need of any human interaction. The bot uses 12V batteries to power the vehicle movement motors as well as the grass cutter motor. We also use a solar panel to charge the battery so there is no need of charging it externally. The grass cutter and vehicle motors are interfaced to an 8051 family microcontroller that controls the working of all the motors. It is also interfaced to an ultrasonic sensor for obstacle detection. The microcontroller moves the vehicle motors in forward direction in case no obstacle is detected. On obstacle detection the ultrasonic sensor monitors it and the microcontroller thus stops the grass cutter motor to avoid any damage to the object/human/animal whatever it is. Microcontroller then turns the vehicle as long as it gets clear of the and then moves the grass cutter in forward direction again. This project of a solar powered automatic grass cutter will relieve the consumer from moving their own lawns and will reduce both environmental and noise pollution. Ultimately, the consumer will be doing more for the environment while doing less work in their daily lives.

II. RELATED WORK

Automated solar grass cutter is a fully automated grass cutting robotic vehicle powered by solar energy that also avoids obstacles and is capable of fully automated grass cutting, without the need of any human interaction. The system uses 12V batteries to power the vehicle movement motors as well as the grass cutter motor. We also use a solar panel to charge the battery so that there is no need of charging it externally. The grass cutter and vehicle motors are interfaced to an 8051 family microcontroller that controls the working of all the motors. The microcontroller moves the vehicle motors in forward direction in case no obstacle is detected. On obstacle detection, IR sensor monitors it and the microcontroller thus stops the grass cutter motor so as to avoid any damage to the object/human/animal. Microcontroller then turns the vehicle until it gets clear of the object and then moves the grass cutter in forward direction again.

III. BLOCK DIAGRAM OF PROPOSED SYSTEM

BLOCK DIAGRAM (Part - 1)

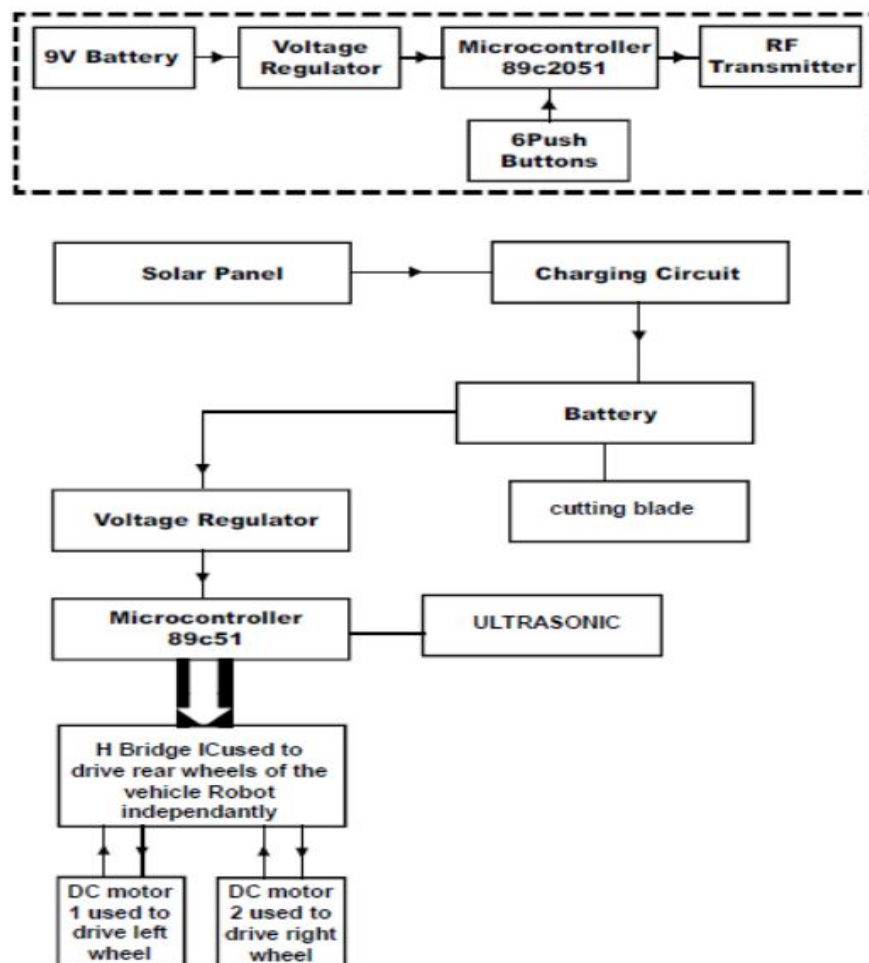


Fig 1: Block Diagram of proposed system

IV. METHODOLOGY

The 10 watts solar panel is used to charge the batteries which are rechargeable. the solar panel gives maximum 18v and 580mA current .we need charging circuit between solar panel and batteries .The charging circuit has voltage regulator which regulates voltage to 15v and one transistor to amplify the maximum current to circuit and diode is used .we use 12 voltage battery for entire circuit and another 12v volts for cutting blade. The microcontroller 8051 takes the input from the ultrasonic sensors , when any interrupt or obstacle occurs the ultrasonic sensor senses the obstacle and gives feedback to microcontroller then according to the program which was given to microcontroller its turns left or right .It waits upto some delay and senses again and same procedure works.if no detection occurs to ultra sonic range then it moves forward until it finds some detection. B The movement of bot is done by using the two DC motors of 100 rpm .The motors are driven by using motor driver (L293D) .It is aslo known as H-Bridge .The main purpose of using motor driver is because that DC motors require the minimum voltage as 9v as input.But the microcontroller gives output as only 5v so we require 9v to 12v for driving the motors.So we use motor driver which takes 5v as input and gives the 12v for motors .The L293D motor driver drives only two motors which can move in both directions. And the cutting blade is used to

cut the grass. to cut any type grass we need high rpm motor, so we used 1400 rpm motor for cutting blade. The motors runs directly by 12v rechargeable battery. The DPDT switches are used for movement of bot and cutting blade separately.

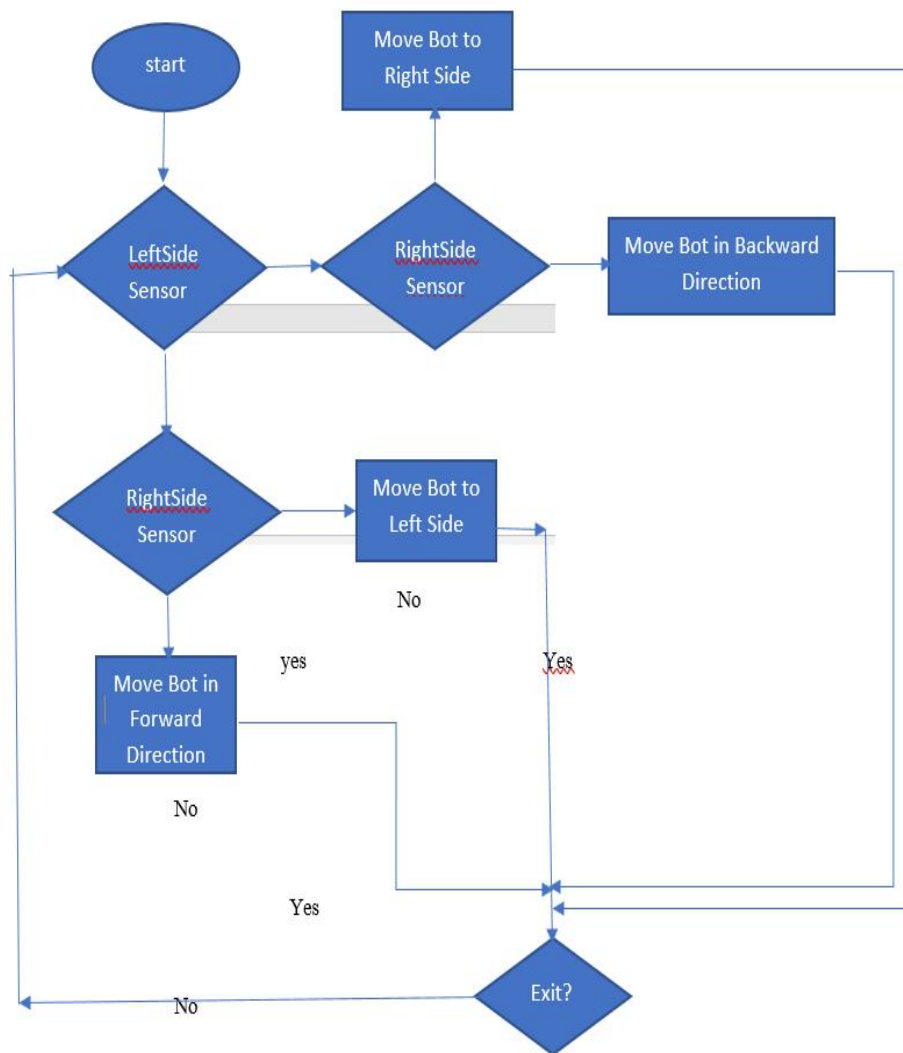


Figure 2: Grass cutter Algorithm

V. RESULT

Our project fully automated solar grass cutter is successfully completed and results are obtained satisfactorily.



Fig 3: Charging Through Solar Panel



Figure 4:Grass cutter Movement

VI. CONCLUSION

It will be easier for the people who are going to take the project for the further modifications. This project is more suitable for a common man as it is having much more advantages that is, no fuel cost, no pollution and no fuel, less wear and tear because of less number of moving components and this can be operated by using solar energy. This will give much more physical exercise to the people and can be easily handled. This system is having facility of charging the batteries while the solar powered grass cutter is in motion. So it is much more suitable for grass cutting also. The same thing can be operated in night time also, as there is a facility to charge these batteries in day light.

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