

AN IMPROVED CONTROLLER FOR GRASS CUTTING APPLICATION

Z. I. Rizman¹, J. Adnan², F. R. Hashim², I. M. Yassin^{3,*}, A. Zabidi³, F. K. Zaman³ and K. H. Yeap⁴

¹Faculty of Electrical Engineering, Universiti Teknologi MARA, 23000 Dungun, Terengganu, Malaysia

²Faculty of Electrical and Electronic Engineering, National Defense University of Malaysia, Kuala Lumpur, Malaysia

³Faculty of Electrical Engineering, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

⁴Faculty of Engineering and Green Technology, Universiti Tunku Abdul Rahman, Kampar, Perak, Malaysia

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ABSTRACT

An improved controller of machine cutter capable to improve grass cutting process become easier. The maneuver of the machine is controlled by radio frequency (RF) remotely, where the transmitter embedded in the remote control while the receiver is placed at the lawnmower. The RF signal is transferred by the remote control to the lawnmower via the antenna (joystick) signal. RF is an effective medium for long distance transmission with low cost. In this project, transmitter and receiver be programmed to control the movement of the lawnmower and the speed of blade. The H-bridge connection in the circuit is used to control the maneuver of lawnmower, whether to be slow or fast. The lawnmower is attached with solar panel circuit in order to charge the battery.

Keywords: remote control; lawnmower; radio frequency (RF); cutter machine; solar panel.

Author Correspondence, e-mail: ihsan.yassin@gmail.com

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1. INTRODUCTION

Today people are too busy from day to day to cut the grasses at the house lawn. In order to be more convenience on doing the jobs with fast cut without hassle during cutting the grasses, a device is created which make the process easier. The machine gives the advantages such as easy to handle, environmental friendly, fast without standing under the sunlight.

In solving this problem, a smart [10] cutter machine is created which function as a lawn mower [2]. This lawn mower [3] also can prevent a house from dangerous animal such as snake and centipede from entered the house. Moreover, the smart [11] cutter machine is modified to give more advantages to the people while use it. This lawn mower [5] is easier to be handle since the movement is controlled by using a remote control [1].

This machine is handled as playing a car control [16]. So, the machine can be controlled from far distance without the need for people to stand nearby the machine. The three blades of the machine also doing a great job in order to make sure the grass is cut with more efficiency. The machine is also environmental friendly by using a solar panel in recharging a battery. The lawn mower [9] used the solar panel to store energy because it more safe than other.

1.1. Objectives

The objectives of the smart [4] cutter machine is to prevent users from animal attack during working with lawnmower. Besides, the machine is environmental friendly [17] which use renewable source to operate. This project capable to protect the user and also environment which avoid injury to people as well as reduce pollution to environment.

1.2. Problem Statement

The transformation of conventional lawnmower to a Smart [13] Cutter Machine will benefit to the users. The machine [6] is produced based on innovative ideas and collaborative thinking from a problem based learning.

The conventional machine may run out of batteries in a small period of time. So, the use of solar panel to recharge the battery either online or offline used may retain the lawnmower in a ready state [14]. On the other hands, this method is environmental friendly.

The improvement to the conventional machine may the grass chopping become faster and effective with additional blade (3 blades) are used. By using remote to control the machine,

peoples only sitting on the balcony while the machine do cutting grass at the garden [7-8].

2. METHODOLOGY

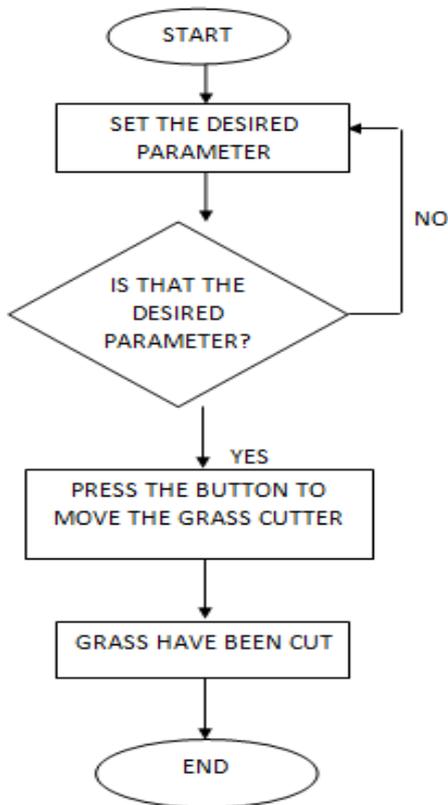


Fig.1. Flowchart of smart cutter machine

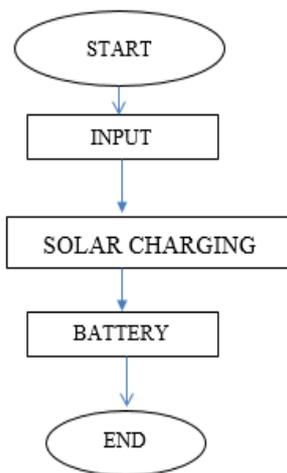


Fig.2. Flowchart of solar panel

3. RESULTS AND DISCUSSION

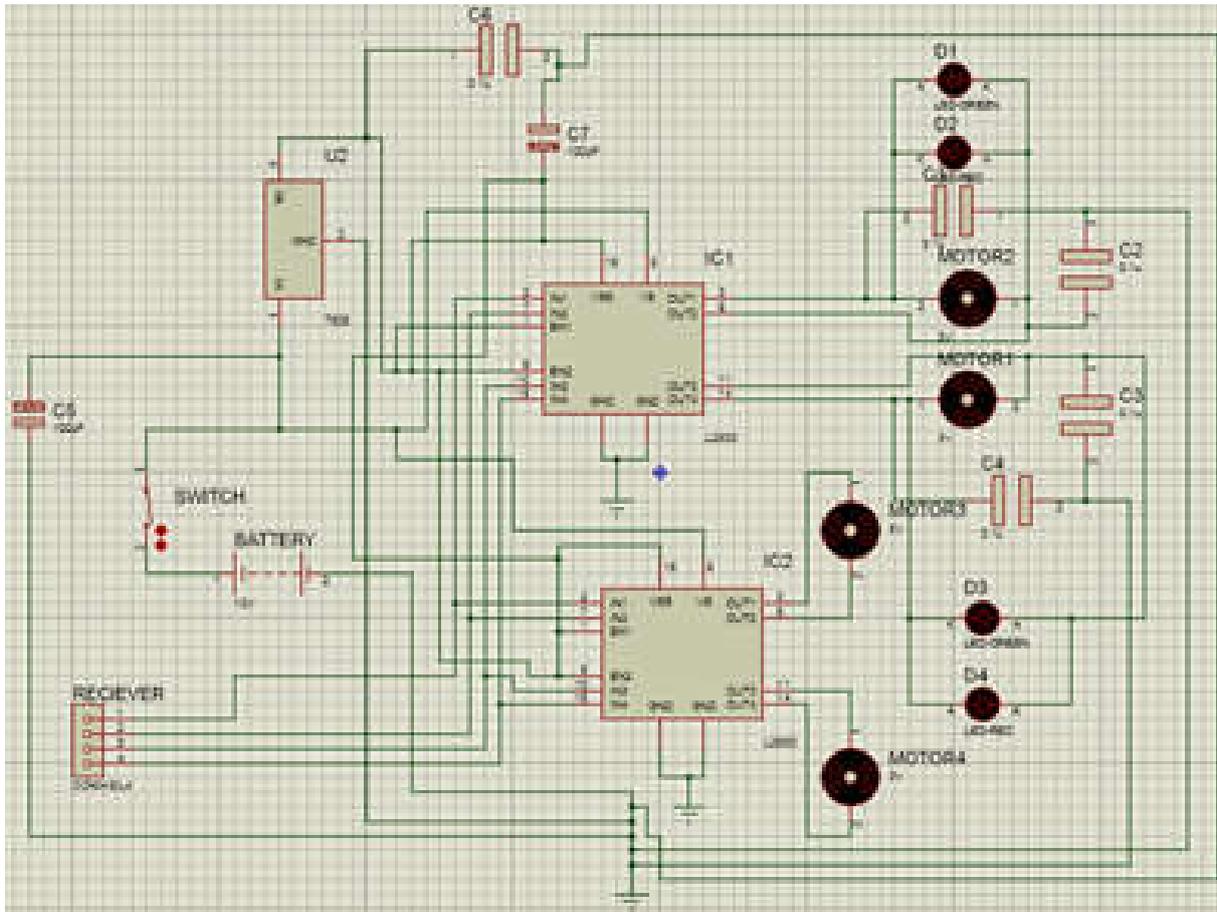


Fig.3. H-bridge simulation

Based on the simulation circuit in Fig. 3, the system used two controllers to control all the instruction with both L293D as the main IC. The IC will control the output that which received from the controller unit. Based on the L293D concept, two inputs will control [15] an output (DC motor). This prototype consists of four DC motors with three motors for each blade (3 blades) while the rest for tire. The IC will have programmed the DC motor to be bidirectional.

The command received from the controller [18] unit is in logic form; Logic 1 indicates ON while logic 0 indicates OFF. When command received is 0000, no movement from a motor. When command is 1010, the motor will move forward. When command is 0101, the motor will move backward. When command is 0110, the prototype will turn left. When command 1001, the prototype will turn right. The movement of the other motors [12] will act as blades of the lawnmower.

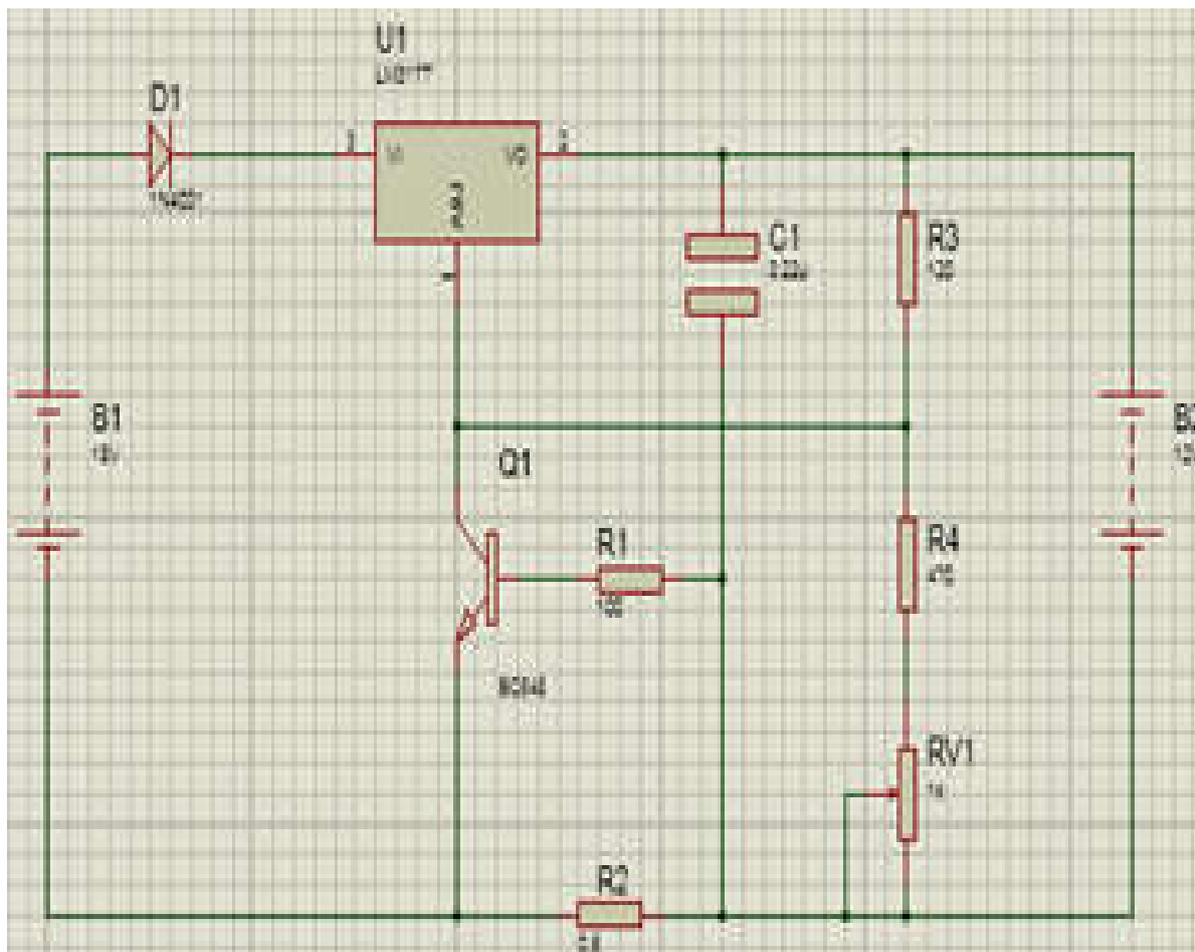


Fig.4. Solar panel simulation

Table 1. Solar reading in each hour for a day

Time	Stored (Volt)
8.00am - 9.00am	3.6
9.00am - 10am	3.81
10.00am - 11.00am	4.94
11.00am - 12.00pm	6.98
12.00pm - 1.00pm	8.898
1.00pm - 2.00pm	9.44
2.00pm - 3.00pm	10.97
3.00pm - 4.00 pm	11.012
4.00pm - 5.00 pm	11.38
5.00pm - 6.00pm	11.56
6.00pm - 7.00pm	11.76

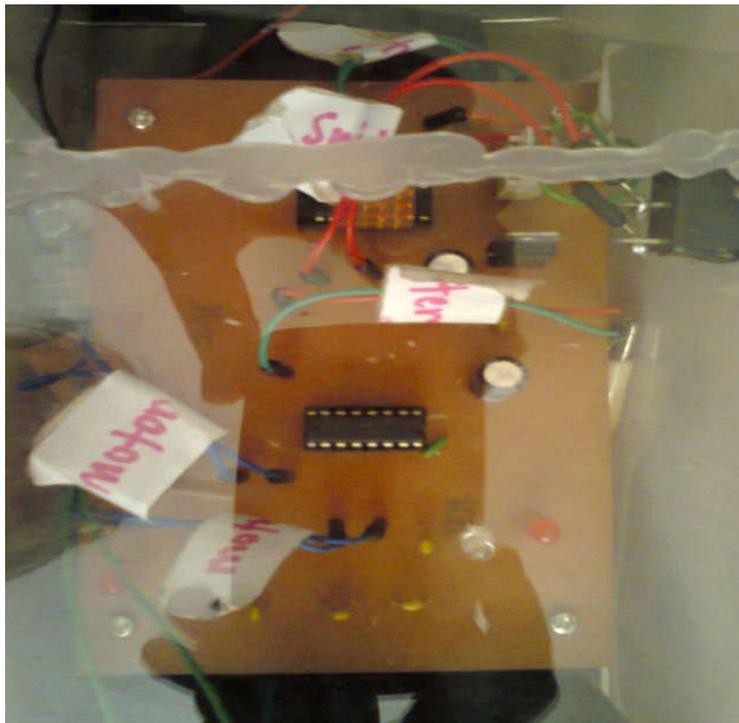


Fig.5. H-bridge on the PCB board



Fig.6. Top view of smart cutter machine



Fig.7. Side view of smart cutter machine

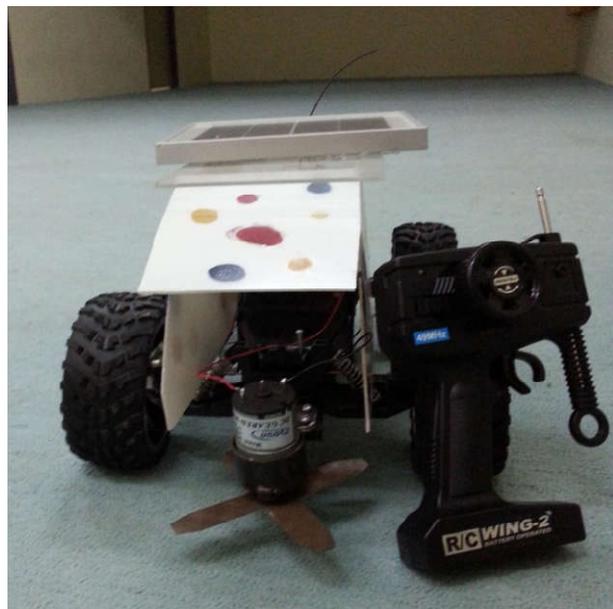


Fig.8. Front view of smart cutter machine



Fig.9. Completed prototype

4. CONCLUSION

In a nutshell, the cutter machine is very useful to the people and more environmental friendly. The H-bridge circuit is the main circuit that controlled the direction of motor. Again, the H-bridge controls the DC motor for tire and blades. In the project, solar panel is used as the backup power and stored at the seal lead acid battery. The smart cutter machine easier to handle since the movement will control by using remote control [19].

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