International Journal on Emerging Technologies (Special Issue NCETST-2017) **8**(1): 190-192(2017)
(Published by Research Trend, Website: www.researchtrend.net*)*
ISSN No. (Print) : 0975-8364
ISSN No. (Online) : 2249-3255

Renewable Energy Powered Unmanned Grass Cutter

Gaurav Joshi, Gaurav Singh, Shashi Niwas, Yogesh Singh and S. C. Sharma
Scholor, Department of Electrical and Electronics Engineering,
Amrapali Institute of Technology & Sciences Haldwani, (Uttarakhand), INDIA

ABSTRACT: Currently grass cutting is a manual process using devices like grass cutting swords, sickles etc. which demands more hard work and more time. Moreover to add to the problem is the non-uniformity in the length of grasses cut. Whereas engine powered machines causes air and noise pollution due to combustion. Keeping the above demerits in focus, the scope of the present work is to design a grass cutter which cuts the grass uniformly and needs very less human intervention. The design uses programmed microcontroller (895S2) along with brushless DC motor and gear motors. This work reduces the air and noise pollution significantly as the power source utilized is solar energy, which reduces the dependency on fossil fuels.

Keywords: Renewable energy, Solar power, Grass cutter, Microcontroller (895S2).

I. INTRODUCTION

Presently grass cutting is done through manual grass cutters which take more time and more human efforts. In manual grass cutter, grass is cut randomly and is of non uniform size. Manual grass cutters with engines causes noise and air pollution with the demands of continuous human intervention. Moreover the increasing fuel cost is also a major concern.

Keeping the above points solar grass cutter is been introduced. Solar energy provides cost efficient and pollution free energy also cope ups with power crisis. The grass cutter is made automatic by the use of microcontroller (895S2) with embedded C programming. Automation in the grass cutter reduces labor, saves time and money. Automatic grass cutter uses motor to cut the grass uniformly and prevents noise and air pollution. The whole work focuses on automation, reduces human efforts, increase efficiency, helps to reduce power crisis and reduces air and noise pollution. Basic equipments used in this work are microcontroller, solar panel, battery, DC motors and cutting blades.

II. METHODOLOGY

Unmanned grass cutter uses solar based energy to power the motors which makes it easy to use where electricity is not available. The solar panel (12v, 2w) charges the battery which supply electrical power to the motors used by the grass cutter. The battery can also be charged from A.C. supply using A.C. adapter.

The grass in the lawn is cut with the help of blades which are attached to a D.C. motor having 500 rpm. The blades are mounted on the cutter at the centre heading downwards. The rotation of grass cutting blades can be started or stopped by a manual switch mount on the vehicle.

The movement of vehicle is done by two D.C. geared motors. The control of these motors is done by microcontroller 895S2 of 8051 family. To move the vehicle to the left, the motor attached to left wheel is stopped and for moving the vehicle to the right, the motor attached to the right wheel is stopped. A particular motor is stopped for a programmed duration of time.

To ensure that no grass is left uncut, vehicle must uphold its path and movement. It is expected to move at constant speed around the area to fulfill the main purpose. At the time of movement grass cutter moves in a linear path and at the extremity it turns at 180 degrees to continue with the same movement in opposite direction and adjacent to previous path taken. Fig. 1 illustrates the path of motion of grass cutter.

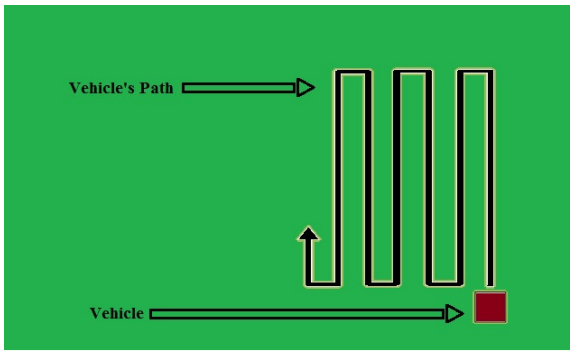

Fig. 1. Grass cutter's path.

The time of operation of motors is done by the use of relays which are activated or deactivated by the programmed microcontroller. The circuit diagram of

the unmanned grass is shown in Fig. 2. The list of components used in the unmanned grass cutter is shown in Table 1 along with their specifications.

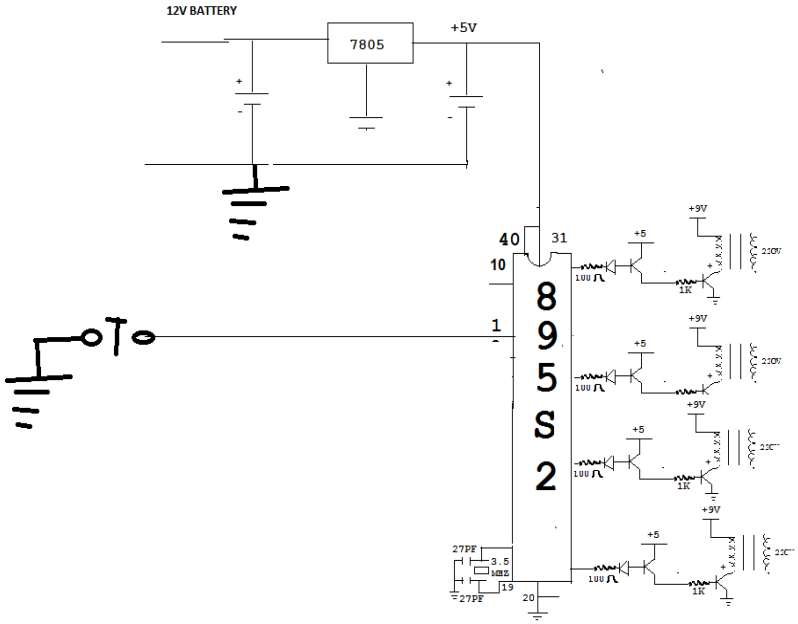

Fig. 2. Circuit diagram of unmanned grass cutter.

Table 1: List of components.

S No.	Name of Components	Nos	Specifications
1	Resistors	4	100 Ω
		4	1 kΩ
2	Capacitors	2	27 pF
3	Microcontroller	1	895S2
4	I.C.	1	7805
5	Isolator	1	3.5 MHz
6	Battery	1	12 v
7	Transistor	4	p-n-p
		4	n-p-n
8	Relays	4	
9	Motors	2	DC gear (30-40 rpm)
		1	DC motor (600-700 rpm)
10	Solar panel	1	2 watt/ 12 volt

III. CONCLUSION

It is concluded from this paper that it is possible to build a low cost automated lawn mower with relatively better performance than the existing technologies. The microcontroller was the key to enabling the project to come together, meaning that with the functions specified and programmed into it, the robot is able to accomplish the specified goal.

Important aspects discussed about the microcontroller include the definition of the port type and the clock speed.

Positioning of the cutting blades was established as being positioned at the centre of the vehicle in order to accomplish good cut of grass, and having two wheels that drive the vehicle was established as being the most effective way of enabling motion in the garden and for the 180 degree rotation required at the end of each motion path.

Limitations are present in this system, which include the shape and size of the garden and environmental (temperature, weather, etc.) conditions. The selection of the relevant sensor can be taken into consideration for these aspects to establish a workaround.

Overall from this project it is demonstrated that an economic automated lawn mower can be produced using a microcontroller, motors and sensors.

REFERENCES

[1]. Kinnander, Ola (October 25, 2012). "Rise of the Lawn-Cutting Machines". Bloomberg Businessweek.

[2]. Friendly Robotics (1995). About Robomow. [ONLINE] Available at: http://www.robomow.co.uk/about/

[3]. Lawn Mower Reviews. (2011). *Automatic Robot Lawn Mowers - Price Comparison*. [ONLINE] Available at: http://www.lawnmowersuk.org/compare/automatic/.

[4]. Diggs, Steven. "Corded Vs. Cordless Electric Lawn Mowers." *ehow*. N.p., n.d. Web. 29 Feb 2012. http://www.ehow.com/about_6581493_corded-cordless-electric-lawn-mowers.html

[5]. Automatic lawn mower vehicle Patent US5163273.

[6]. Lawn mower robots are coming out of the garages of hobbiests and into business. N.P.,N. D. web. 29 feb 2012. http://www.robots-android.com/lawn-robots.html

[7]. Robotic lawn mower. Super lawn mower http://superlawnmower.com/category/robotic-lawn-mower/.