

Automated Solar Grass Cutter

Aadesh Dogiwal¹, Anoop Mathai², Arpit Prajapati³, Patel Jaydeep⁴, Vatsal Trivedi⁵, Varad Acharya⁶,
Patel Ravi⁷, Udaiyar Nirmal⁸

^{1,2,3,4,5,6,7,8} LDRP- ITR GANDHI NAGAR

Abstract- The Sun has been a major source of life on earth since years. Previously the energy was being used for farming sector, drying clothes etc. On account of increase in demands of energy solar energy can be efficiently utilized in many sectors. Out of many one such area is solar grass cutting. A solar grass cutter is a machine that uses sliding blades to cut a lawn at an even length. The machine gains its energy from the sun using a solar panel, where the energy is being stored in the battery as to avoid any external charging. Power consumption becomes essential for future. It is used to maintain and upkeep lawns in gardens, schools, college' set c. In this report we are trying to develop a daily purpose robot which is able to cut the grass in lawn using IR sensors, ultrasonic sensors, et c. for obstacle detection.

Index terms- Blade, Grass, Motors, charge controller, solar panel, tyrsers

INTRODUCTION

The first lawn mower was invented by Edwin Budding in 1830 in Thrupp, just outside Stroud, in Gloucestershire, England. Budding's mower was designed primarily to cut the grass on sports grounds and extensive gardens, as a superior alternative, and was granted a British patent on August 31, 1830] in 1995, the first fully solar powered robotic mower became available.

Automated solar grass cutter are increasingly demand which are sophisticated, self - docking and some contain rain sensors if necessary, nearly eliminating human interaction .The device uses solar energy to run the device. We also use a solar panel to charge the battery so that there is no need of charging it externally. The absorbed solar energy is stored into the battery that will be available whenever needed. The solar charger installed in the device prevents the overcharging and discharging of the battery and also ensures battery back- up. The micro- controller takes

the device in forward direction until an obstacle is detected.

The grass cutter and vehicle motors are interfaced to an 8051 family.

Micro controller that controls the working of all the motors. It is also interfaced to an ultrasonic sensor for object 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 robotic as long as it gets clear of the object and then moves the grass cutter in forward direction again.

LITERATURE REVIEW

Srishti Jain and et al (1) in their paper have proposed a solar powered robotic lawn mower which is an autonomous lawn mower that will allow the user the ability to cut the grass with minimum effort. Unlike other robotic lawn mowers in the market, this design requires no perimeter wires to maintain the robot within the lawn and also with less human effort in the manual mode operation. Through an array of sensors safety takes major consideration in the device, this robot will not only stay on the lawn, it will avoid and detect objects and humans. Here they used a 12v 310mA solar panel in their project. There are 24 solar cells on the solar panel, each contributing to 0.5v each. They could attach a battery but as the lead acid rechargeable battery used is rated 12v 1.2Ah, it won't be overcharged due to the small output of solar panel. To detect the obstacles, they used IR sensors which have 1m 555IC. There are two sensors, one on each side. This is because in case the obstacle is on the left then it will move in right direction and if the right sensor detects the obstacle then it goes towards the left.

Pankaj Malviya et al. (2) Author prepared manually handle device. The battery can be charged by using solar panel as well as external power supply and DC motor which is controllable is used for changing the direction of grass cutter as per need are used. The most modern regulator is used for preventing overcharging and discharging of battery which saves span of battery. Due to industrialization more electricity is required for various industrial applications and electrical gadgets so solar energy is best alternative for electricity. Solar panel, battery, DC motor, solar charger these components are used for fabrication of grasscutter. They have used less number of moving components so there is less maintenance. This grass cutter will give much more physical exercise to operator and it will easily handle. Ms. Bhagyashri R. Patil and et. al(3), proposed the design of solar powered agricultural equipment that include direct current (DC) motor, a rechargeable battery, solar panel, a stainless steel blade and control switch. The automatic grass cutting machine is going to perform the grass cutting operation by its own which means no manpower is mandatory. They have used many components for preparing grass cutter like DC Motor(3) for rotating the wheels and blade, wheels(4), battery, Solar panel, IR sensor, Collapsible blade. There are two main components such as transmitter and receiver. Transmitter continuously transmits the rays if any obstacle come in front of grass cutter then the rays are reflected back towards the receiver. The receiver receives the signal in the serial form from encoder but microcontroller requires parallel data for communication so receiver sends data to decoder to convert data in the parallel form and then it is passed to microcontroller.

CONCEPT OF SOLAR BASED GRASS CUTTER

Coming to the Concept of solar grass cutter, it has panel mounted on top of model in a particular arrangement such that angle of inclination is 45 degree hence it can be receive high intensity solar radiation easily. Solar panel converts solar energy into electrical energy. This electrical energy is stored in the battery. The motor is connected to the battery through connecting wires. The cutting blades tap the power from DC motor and which in turn actuates the blades and hence rotating blades cut the grass. Trees produce their food by Photosynthesis. In

photosynthesis Trees collect sun energy and the water from soil at the day time and prepare their food. In this way they are providing food to the human society indirectly as we depend on the green plants for our food. The working of solar tree can be understand by an example of a tree in which the solar panel acts like leaves and stems connected acts as the branches of the tree. Solar plates of solar tree are producing energy for the society like green leaves produces food for human beings. So it is called tree. This device consists of linear blades and it does not affected by atmosphere. They have used following components for preparing grass cutter. If any obstacle comes in front of grass cutter then it sense by IR sensor and gives signal to the microcontroller to change the direction or stop the grass cutter until the obstacle is removed.

Fig Block Diagram of solar based grass cutter

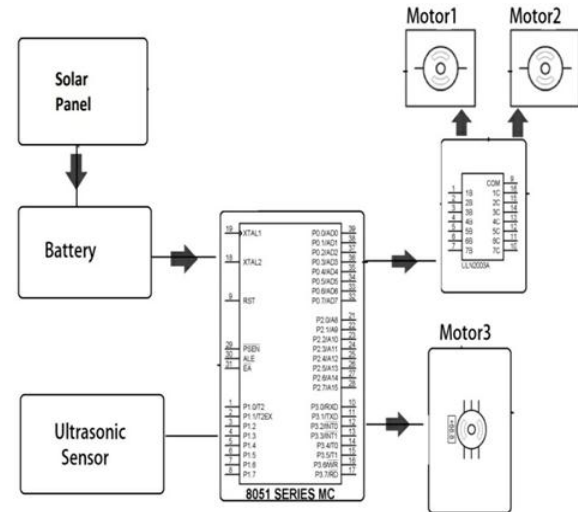
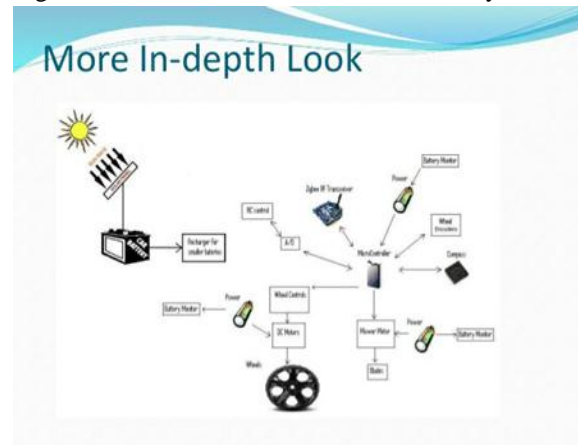


Fig. 3. Schematic illustration of the whole system



The main objective of this paper is to move the grass cutter in different directions to prepare various

designs as per requirements. They have used solar panel so it is not required to charge battery externally and battery is continuously charged at constant voltage when grass cutter is in working. The battery is charged in day time by using solar panel and it is stored so we can use grass cutter at night time also. Because of two DC motor both forward and backward motion of grass cutter can simultaneously possible. In this paper explained that solar plate which is placed above the grass cutter generates solar energy and use this energy for working the grass cutter. Solar panels, batteries, DC motor, solar charger, circuitry and blades these components are used for preparing grass cutter. For preventing battery from overcharging and over discharging regulator is placed into the system and it should be placed in series. The battery can be charged by using solar panel as well as external power supply and DC mot or which is controllable is used for changing the direction of grass cutter as per need are used.

CONCLUSION

This grass cutter occupy less space and light in weight and as it uses nonconventional source of energy hence running cost is zero. It has facility of charging battery while grass cutter is in the working condition. The cost of solar based grass cutter is less than the market grass cutter. Grass cutter is used to keep the lawn clean as per demand.

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