

Solar Based Autonomous Grass Cutter

Hrishikesh B. Lohot¹, Akshay D. Shinde², Manadr R. Mhatre³, Suraj D. Jadhav⁴, Sharvari Sane⁵

^{1,2,3,4}UG Student, Department of Electrical Engineering, Vishwaniketan's iMEET, Khalapur, India

⁵Professor, Department of Electrical Engineering, Vishwaniketan's iMEET, Khalapur, India

Abstract: Nowadays 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 also economical. The aim of our project is to make the grass cutter which operates on solar energy hence save the electricity and reduces manpower. In our project we use microcontroller for controlling various operation of grass cutter.

Keywords: Solar panel, Battery, Solar, Dc Motor, Microcontroller, IR sensor, Relay, Blades.

1. Introduction

Grass cutter machines have become very popular today. Most of the times, grass cutter machines are used for soft grass furnishing. In a time where technology is merging with environmental awareness, consumers are looking for ways to contribute to the relief of their own carbon footprints. Pollution is man-made and can be seen in our own daily lives, more specifically in our own homes. The system will have a power source that is battery and a solar panel will be attached on the top of the robot. Moving the grass cutters with a standard motor powered grass cutters is a nuisance, and no one takes contentment in it. Cutting grass cannot be effortlessly accomplished by elderly, younger, grass cutter moving with engine create noise pollution due to the loud engine, and local air pollution due to the combustion in the engine. Also, a motor powered engine requires intermittent maintenance such as altering the engine oil. Even though electric solar grass is ecological friendly, they too can be an inconvenience. Automatic grass cutting machine is a machine which is going to perform the grass cutting operation on its own. This model reduces both environment and noise pollution. This project of a solar powered automatic grass cutter will relieve the consumer from mowing their own lawns and will reduce both environmental and noise pollution. The aim of our project is to make the grass cutter which operates on solar energy hence save the electricity and reduces manpower. In our project we use microcontroller for controlling various operation of grass cutter.

2. Problem statement

- The past technology of grass cutting is manually

operated by the use of hand devices like scissor, these results into more human effort and more time required accomplishing the work. Also in old methods lack of uniformity of the remaining grass. Also due to the use of engine powered machines increases the air and noise pollution also this grass cutter require maintenance.

- The purpose is to avoid energy crisis in India and reduces the human efforts, operating cost and maintenance cost.

3. Objective

The objective of our project is to design and automatic lawn mower which operates on solar energy and avoids the drawback of old lawn mowers. The purpose is to avoid energy crisis in India and reduces the human efforts, operating cost and maintenance cost. Also solar based grass cutter keeps the environment clean and healthy. It is used for cutting different types of grasses for various applications. The whole machine operates on the solar energy stored in battery. The IR sensor is used for the obstacle detection to avoid any damage of the human, object and animal. Also we are using relay to control the motor connected to blades as a switch. The prototype is charged from sun by using solar panel.



Fig. 1. Solar Based Grass Cutter

4. 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 understood 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 produce food for human beings. So it is called tree. This device consists of linear blades and it is not affected by climatic conditions. They have used following components for preparing grass cutter. If any obstacle comes in front of grass cutter then it is sensed by IR sensor and gives signal to the microcontroller to change the direction or stop the grass cutter until the obstacle is removed.

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 motor which is controllable is used for changing the direction of grass cutter as per need are used.

5. Components of solar based grass cutter

- Solar panels
- DC Motor
- Wheel
- Batteries
- IR sensor
- Blade

6. Key feature of solar grass cutter

- Project is to design and automatic lawn mower which operates on solar energy and avoids the drawback of old lawn mowers.
- It is used for cutting different types of grasses for various applications
- It will have wheels that control forward and backward moment as well as turning.
- Grass cutter will have the ability to be controlled automatically.
- Microcontroller to interact with and control other components.

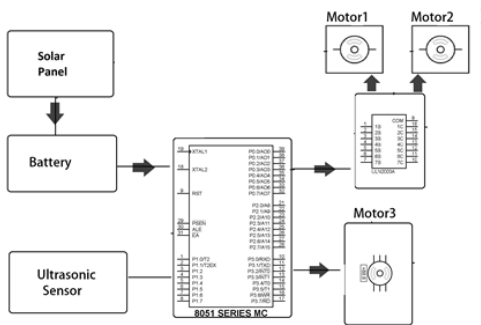


Fig. 2. Block Diagram of solar based grass cutter

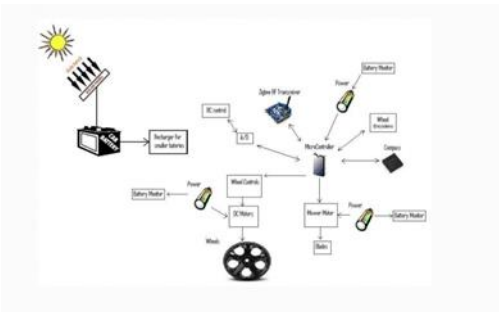


Fig. 3. Schematic illustration of the whole system

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 be possible. In this paper explained that solar panel 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



Fig. 4. Dc Geared motor



Fig. 5. Solar Panel

7. Feature in solar based grass cutter

This can be further improved by incorporating the following modifications to obtain better results. The mechanism which we used i.e. scotch yoke mechanism does not give excepted efficiency. This efficiency can be increased by using some other mechanism. and speed of motor is reduced because we have used heavy material and this material can be replaced by using light

weight material .and design of blades should be done based on types of grass is used to cut. The project which we have done surly reaches the average families because the grass can be trimmed with minimum cost and with minimum time finally this project may give an inspiration to the people who can modify and can obtain better results.

- *Ecologically friendly:* for obvious reason the use of solar Grass Cutter is ecofriendly and considered one of the "green" electricity resource. Because, they operate by interacting with renewable energy source, sunlight, there is no fear of depleting yet another natural resource.
- low maintenance
- Solar panels have no movable parts and are very simple to use.
- Compact size and portable
- Easy to move from one place to another place

8. 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 and uniform in schools, gardens and playgrounds.

References

- [1] Ashish Kumar Chaudhari, YuvrajSahu, PramodkumarSahu, Subhash Chandra Verma, Smart Solar Grass Cutter Robot for Grass Trimming, International Journal of Advance Research and Innovative Ideas in Education, Vol. 2, 2016, 1246-1251.
- [2] Vicky Jain, Sagar Patil, PrashantBagane, S. S. Patil, "Solar Based Wireless Grass Cutter," International Journal of Science Technology and Engineering, Vol. 2, 2016, 576-580.
- [3] https://www.youtube.com/watch?v=2kCJ_4OxHI8
- [4] <http://nevonprojects.com/fully-automated-solar-grass-cutter/>