

# A Review on Smart Solar Grass Cutter with Lawn Coverage

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**Abstract:** The grass cutter uses a solar based energy source, which is easier to use, more advantageous compared to other energy source especially for gas based source of power. But our grass cutter is based on solar power because this energy is a renewable energy source and it is easy to work. So we made solar powered grass cutter.

**Keywords:** Solar Power, Battery Lawn Mower, DC Motor.

## 1. Introduction

In today's climate of growing energy needs and increasing environmental concern, alternatives to the use of non-renewable and polluting fossil fuels have to be investigated. One such alternative is solar energy. In this solar based grass cutter, the advantage of powering a grass cutter by solar rather than by gasoline is mainly ecological. We manufactured this grass cutter because it is very easy method and many problems are overcome by this type of grass cutter. The self-powered objective is to come up with a cutter that is portable, durable, easy to operate and maintain. It also aims to design a self-powered cutter of electrical source; a cordless electric grass mower. The heart of the machine is a battery powered dc electric motor. It is also useful method for our grass cutter. It is similar to our lawn cutter using display and keypad. The present technology commonly used for trimming the grass is by using the manually handle device. In this project we have automated the machine for trimming the grass. The device consists of blade which is operated with the help of the motor the power supply for the motor is by using battery. The battery can be charge by using power supply and solar panel.

## 2. Materials and methods

The Working of solar grass cutter is it has panels mounted in a particular arrangement at an in such a way that it can receive solar radiation with high intensity easily from the sun. These solar panels convert solar energy into electrical energy. This electrical energy is stored in batteries by using a solar charger. The main function of the solar charger is to increase the current from the panels while batteries are charging, it also disconnects the solar panels from the batteries when they are fully charged and also connects to the panels when the charging in batteries is low. From the motor, the power transmits to the mechanism and this makes the blade to slide on the fixed blade and this

makes to cut the grass

## 3. Literature survey

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## 4. Block diagram

A solar panel is a set of solar photovoltaic modules electrically connected and mounted on a supporting structure.

A photovoltaic module is a packaged, connected assembly of solar cells. The solar panel can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications.

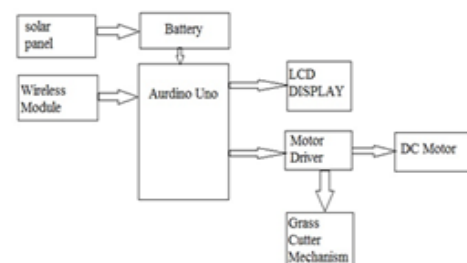


Fig. 1. Block diagram



Fig. 2. Solar panel

A. Solar energy

Solar energy is radiant light and heat from the sun harnessed using a range of ever-evolving technologies such as solar heating, solar photo voltaic, solar thermal energy, solar architecture and artificial photosynthesis. Solar energy is very large, inexhaustible source of energy. The power from the sun interrupted by earth is approximately 1.8/10MW, which are many thousands of times larger than the present consumption rate on the earth of all energy sources 10W, 300mAmp/ Hour 100mA/h Battery

Energy= Power \* Time 10W Solar Panel

Vmp=12 V

Imp =0.6 V

Type of Solar material=Polycrystalline Silicon Weight =3.3 lbs. /1.5 kg

Dimensions = 10\*10\*.7"/245\*410\*17.8mm

Connector = Wires .18"

Calculations Day

Imp\*Peak sun hours /day \*13 v = watt hours/ day

Comparison

Table 1  
Comparison

SOLAR SYSTEM		FUEL SYSTEM
1	Totally free from pollution	Pollution is a great factor
2	No fuel consumption	Fuel is the important need
3	No. of reciprocating parts are less	No. of reciprocating parts are more
4	Friction is greatly reduced	Frictions between the parts are high
5	Low cost and maintenance	Maintenance is difficult & costly
6	Load carrying capacity is low	Load carrying capacity is high
7	Continuous ride for hours together is not possible	Continuous ride is possible
8	Ratio of speed reduction more when weight increases very much	Speed reduction ratio is less and it does not vary

B. L293D

Since motors require more current than the microcontroller pin can typically generate, you need some type of a switch (transistors, MOSFETs, Relay etc.) which can accept a small current, amplify it and generate a larger current, which further drives the motor. This entire process is done by what is known as Motor Driver. L293D is a typical motor driver or motor driver IC which allows DC motor to drive on either direction. L293D is a 16 pin IC which can control a set of two DC motors in any direction. It means that you can control two DC motors with a single L293D IC, dual H-Bridge motor driver integrated circuit (IC). The L293D can drive small and quite big motors as well.

C. Problems identification

Earlier most of the activities are done by manually. Gradually so many big and small equipment's are developed to ease human activities, thus to reduce the human efforts to do the things. Now a day's most of the activities which included human efforts are either replaced or automated by the use of machines or other kinds of equipment's. Skilled persons are required for conventional grass cutter .why because here we uses animals like bulls .now a days the technology is developed in other hands skilled persons with convention grass cutters were decreased. Now we have a need to depend on the

technology. Due to the risk involved in a conventional grass cutter, now days very few peoples coming forward to grass cutting by conventional grass cutter .moreover, educational background of Indian youth is improving. So most of people hesitate to use conventional grass cutter

D. Solar panel: Photovoltaic principles

The photo voltaic effect can be observed in nature in a variety of materials that have shown that the best performance in sunlight is the semiconductors as stated above. When photons from the sun are absorbed in a semiconductor, that create free electrons with higher energies than the created there must be an electric field to induce these higher energy electrons to flow out of the semi-conductor to do useful work. A junction of materials, which have different electrical properties, provides the electric field in most solar cells for the photon interaction in a semiconductor. A solar cell consists of

- Semi -conductor in which electron hole pairs are created by the absorption of incident solar radiation.
- Region containing a drift field for charge separation.
- Charge collecting front and back electrodes.

E. Photovoltaic effect

The photo-voltaic effect can be described easily for p-n junction in a semi-conductor. In an intrinsic semi-conductor such as silicon, each one of the four valence electrons of the material atom is tied in a chemical bond, and there are no free electrons at absolute zero. If a piece of such a material is doped on one side by a five valance electron material, such as arsenic or phosphorus, there will be an excess of electrons in that side, becoming an n-type semi-conductor. The excess electrons will be practically free to move in the semi-conductor lattice. When a three valance electron material, such as boron dopes the other side of the same piece, there will be deficiency of electrons leading to a p-type semi-conductor. This deficiency is expressed in terms of excess of holes free to move in the lattice. Such a piece of semi-conductor with one side of the p-type and the other, of the n-type is called p-n junction. In this junction after the protons are absorbed, the free electrons of the n-side will tends to flow to the p-side, and the holes of the p-side will tend to flow to the n-region to compensate for their respective deficiencies. This diffusion will create an electric field from the n-region to the p-region. This field will increase until it reaches equilibrium for voltage, the sum of the diffusion potentials for holes and electrons. If electrical contacts the connected through an external electrical conductor, the free electrons will flow from the n-type material through the conductor to the p-type material as shown in the figure. Here the free electrons will enter the holes and become bound electrons thus both free electrons and holes will be removed. The flow of electrons through the external conductor constitutes an electric current, which will continue as long as move free electrons and holes are being formed by the solar radiation. This is the basis of photo-voltaic conversion that is the conversion of solar energy into electrical energy. The combination of n-type and p-type

semiconductors thus constitutes a photo-voltaic cell or solar cell. All such cells some rate direct current that can be converted into alternating current it desired. The photo-voltaic effect can be observed in almost any junction of material that have different electrical characteristics, but the best performance to date has been from cells using semiconductor material especially all of the solar cells used for both space and terrestrial applications have been made of the semiconductor silicon. Future cells may use such materials as the semiconductors like Gallium arsenate, copper sulphate cad sulphide etc. The device used to utilize the photovoltaic effect is solar cell.

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.

### 6. Future work

- This project is useful at the basic level of grass cutting.
- If we are considering the situation of soil and grass then we can interface the robot with a humidity sensor and a sprinkler so that it can sense the humidity of the desired ground and the sprinkler may sprinkle the water according to the implemented program.

### 7. Conclusion

By using this system we can preserve the non-renewable sources of energy such as petrol, gasoline etc. We can also reduce various forms of pollutions such as air pollution and noise pollution. Electricity is saved as we utilize solar energy that is renewable source of energy and is present in abundance.

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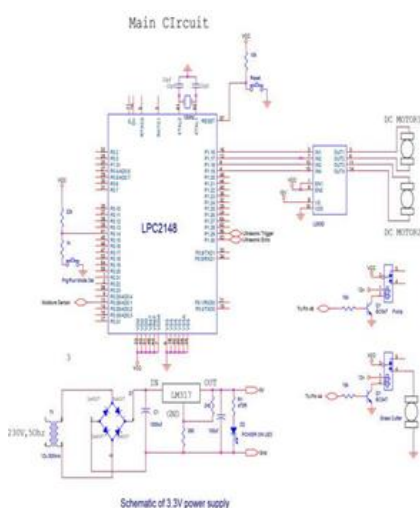


Fig. 3. Circuit Diagram

### 5. Working of grass cutter

Coming to the working 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