

# Smart Solar Grass Cutter With Lawn Coverage

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**Abstract:** From time immemorial, the sun has been the major source of energy for life on earth. The solar energy was being used directly for purposes like drying clothes, curing agricultural produce, preserving food articles, etc. Even today, the energy we originate from fuel-wood, petroleum, paraffin, hydroelectricity and even our food originates obliquely from sun. Solar energy is almost unbounded. The total energy we obtain from the sun far exceeds our energy demands. Ever since the industrial revolutions human have been dependent on fuels, electricity and wind energy. For human enlargement in many countries there is study and trials are going on the Solar energy and the wind energy, So we make our new concept solar powered grass cutting machine in these concept we cut grass on the agricultural products or on small plants in lawns and gardens. Remote controlled grass cutter can be described as the application of Radio frequency to power a machine on which electric motor rotates which in turn rotates a blade which does the mowing of a grass.

**Key words:** Blade, solar Panel, DC Motor, Microcontroller, Sensor.

## 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. Herein, we propose a model of the automatic grass cutting machine powered through solar energy, (nonrenewable energy). 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.

Our new design for an old and outdated habit will help both customer and the environment. 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. This design is

meant to be an alternate green option to the popular and environmentally hazardous fuel powered lawn mower. Ultimately, the consumer will be doing more for the environment while doing less work in their daily lives. The hope is to keep working on this project until a suitable design can be implemented and then be ultimately placed on the mark.

## 2. LITERATURE SURVEY

G. Rahul describes the application of solar energy to power an electric motor which in turn rotates a blade which does the cutting of grass. Bhosale Swapnil, Khadake Sagar explained that the smart solar grass is automatic system for the purpose of grass cutting. The source is driven from the solar energy by using solar panel from the panel and store the voltage in battery. The automatic grass cutting machine is designed using photovoltaic source and motor speed control. Ms. Yogita D. Ambekar, Mr. Abhishek U. Ghate describes the aim of project is to make the grass cutter which operates on solar energy hence save the electricity and reduces manpower. In this project we use microcontroller for controlling various operation of grass cutter. P.Amrutesh, B.Sagar, B.Venu proposed smart solar grass cutter system in which there is an use of sliding blades to cut a lawn at an even length. Unskilled operations can operate easily and maintain the lawn very fine and uniform surface look.

## 3. METHODOLOGY

### I. Block Diagram

Block diagram consist of following components:

1. PIC Microcontroller 16F877
2. Gyroscope sensor
3. Battery
4. ULN 2003
5. Solar panel
6. DC Motors
7. Blade Motor
8. LCD Display

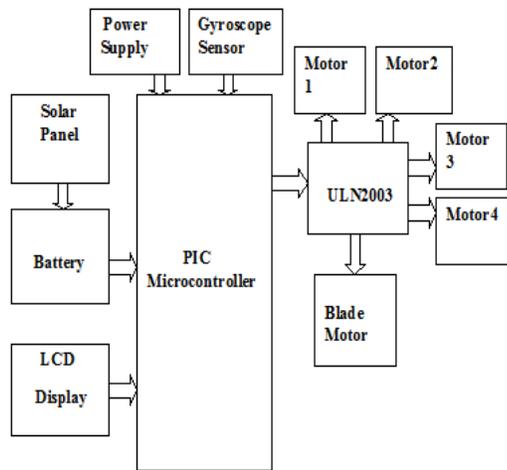


Fig. Block Diagram

## II. Block Diagram Description

### 1. Microcontroller

It is advanced controller with more features. System control is done by using controller 16f877. It is heart of the system it controls all operations. Controller requires +5v for working properly. It provides 18mA current.



Fig. PIC Microcontroller 16F877A

### 2. Solar panel

A solar panel is a set of solar photovoltaic module electrically connected. The source is driven from the solar energy using solar panel which receives energy and convert it into electric energy. Solar panel generates energy upto 12V.



Fig. Solar panel

### 3. Battery

Solar cell module produces electricity only when the sun is shining. They do not store energy. It is necessary to store some of the energy produced. So we use battery to store electrical energy generated by the solar panel. It is also used for the powering operation system. The battery is of 12V DC.



Fig. Battery

### 4. DC Motors

There are 4 Dc motors are used for movement of the wheel. These motors are brushless DC motors. These Motors are Driven by the driver IC ULN2003. The speed of the motor is 30rpm.

The ULN2003 is used for the current boosting. Motors requires more current for work properly so these IC is used. It increases current up to 200mA.



Fig. DC Motor

### 5. Blade Motor

Blade motor is used for cutting operation of the grass. These motor have more Speed than the other 4 motors. These Motor has speed of about 1000rpm.blades are the cutting components of lawn mowers. These blades are very sharp. we use rotating blade for these system



Fig. Blade Motor

### 6. LCD Display

It is used to show various messages on LCD. Although LCD does not have much use in actual application but still it is very useful for testing purpose and while developing this project, because we shoe various messages like obstacle detected immediate stop the system.

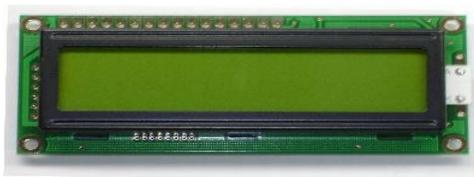


Fig. LCD Display

### 7. Gyroscope Sensor

Gyroscope Sensor ADXL335 is used for controlling the direction of the system. the sensor has 3 outputs X Y and Z. The X out is used changing the direction of system to left or right and Y out is used for up or down these sensor is also used as accelerometer sensor to control the speed of the system.

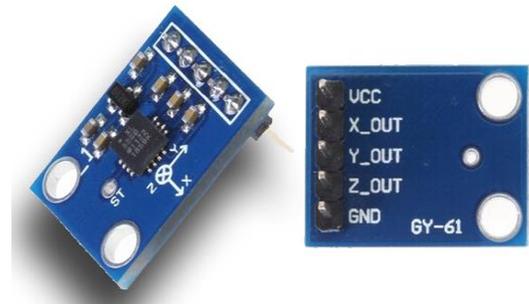
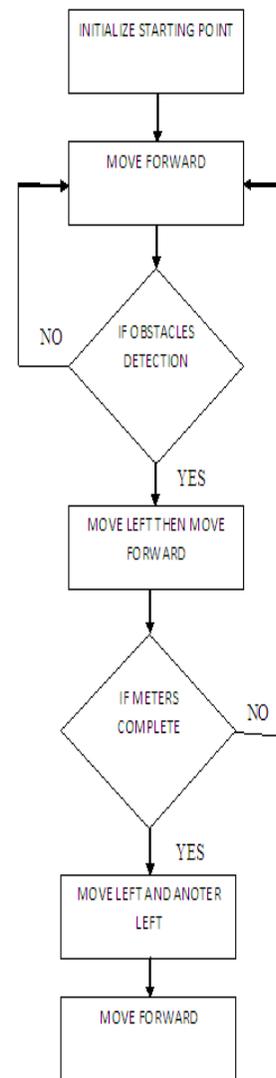


Fig. Gyroscope sensor

## III. SOFTWARE DESCRIPTION



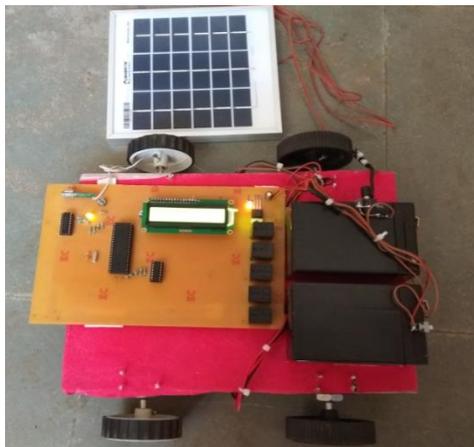
1. Start the system.
2. Move the system forward by changing the direction of transmitter circuit to down.

3. If obstacle occurs then move the grass cutter according to our convenience that is to left, right, reverse and if there is no obstacle then move forward.
4. When meters complete then move machine to left and another left or right and another right.
5. And move the machine forward.

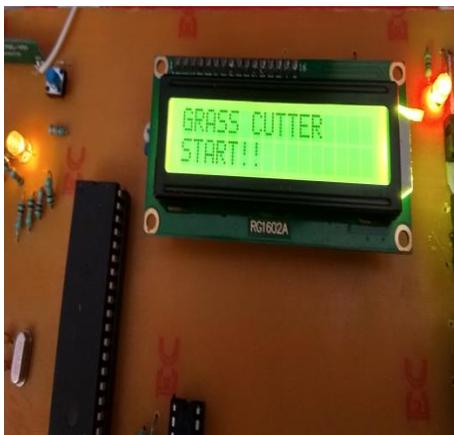
**4. RESULT AND DISCUSSION**

According to below table the direction of system changes as follows

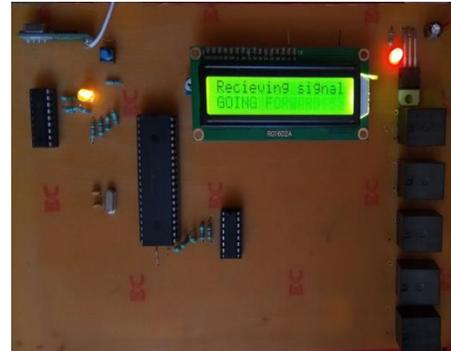
Condition	Direction
1000	Forward
0100	Reverse
0010	Right
0001	Left



**Fig. Smart solar grass cutter**



**Fig. Initialization of system**



**Fig. Movement of system**

**5. CONCLUSION**

Our project is more suitable for a common man as it is having much more advantages. This will give much more physical exercise to the people and can be easily handled. This system is having facility of charging the batteries while the solar powered grass cutter is in motion. The same thing can be operated in night time also, as there is a facility to charge these batteries in day light.

**ACKNOWLEDGEMENT**

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