

Smart Solar Grass Cutter Robot for Grass Trimming

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ABSTRACT

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 linear 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. In case of any obstacles in the path it is sensed by using an IR sensor. If there is any variation then the device using free direction sensor and find the new path to travel. The above feature is enabled so that the damage to the hardware of the device is avoided. In future the automation of the device will play a vital role in world wide.

Keyword: - IR sensor, DC Motor, Solarpanel, and linearblades

1. INTRODUCTION

Now a days there are lots of development work has been pending but there are still some labor power which requires lots of income distribution for a small work. So this is required that some work should have some other alternative so that the labor power wastage can be avoided. So in our project we are trying to make a daily purpose robot which is able to cut the grasses in lawn. The project work will be done according to the proper application based fabrication. The system will have some automation work for guidance and other obstacle detection. 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 an inconvenience, and no one takes pleasure in it. Cutting grass cannot be easily 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 periodic maintenance such as changing the engine oil. Even though electric solar grass are environmentally friendly, they too can be an inconvenience. Along with motor powered grass cutter, electric grass cutters are also hazardous and cannot be easily used by all. Also, if the electric grass cutter is corded, mowing could prove to be problematic and dangerous. The prototype will also be will be charged from sun by using solar panels.

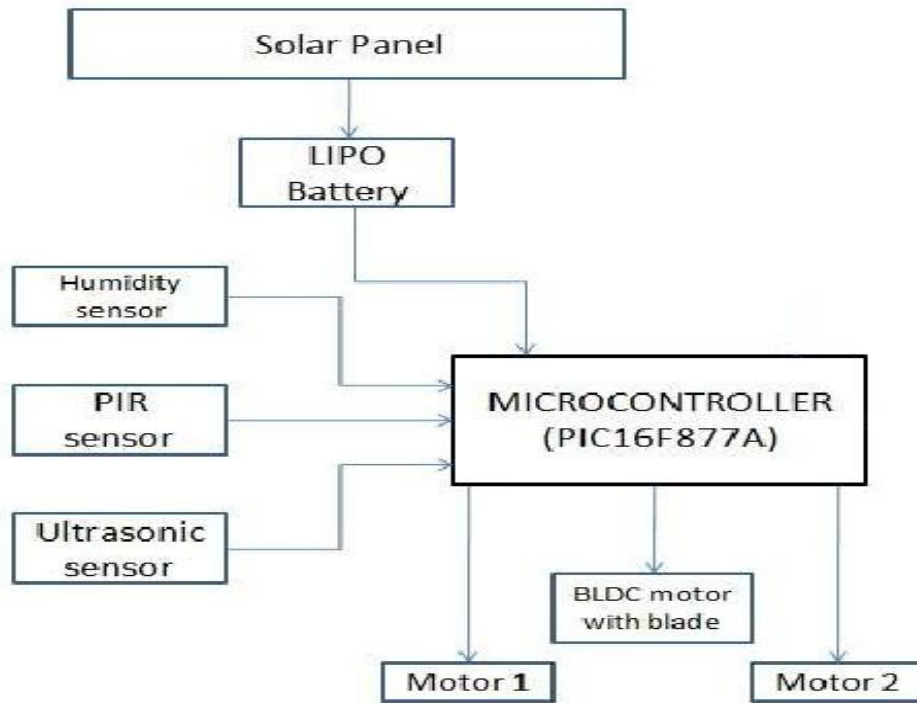


Figure- 1. Image of Block Diagram of model

1.1 Focus of project work

The project work is focused on preparing an advantageous power source for grass cutting operation which is not dependent on the climates condition and is punctual on its work. Moving the grass cutters with a standard motor powered grass cutters is an inconvenience, and no one takes pleasure in it. Cutting grass cannot be easily 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 periodic maintenance such as changing the engine oil. Even though electric solar grass are environmentally friendly, they too can be an inconvenience. Along with motor powered grass cutter, electric grass cutters are also hazardous and cannot be easily used by all. Also, if the electric grass cutter is corded, mowing could prove to be problematic and dangerous. The prototype will also be will be charged from sun by using solar panels.

1.2 Literature Review

For designing of Automatic Lawn Cutter we referred various literature, papers etc. The review of previous method used given below: In this lawn mower uses a solar based energy source, which is easier to use, more advantageous comparing to other energy source especially for gas based source of power. But our lawn cutter is not based on solar because of its cost and may create some complexity during working. So we avoided solar powered lawn mower [1]. In this hydrogen based lawn mower, the advantage of powering a lawn mower by hydrogen rather than by gasoline is mainly ecological. We not used this for our lawn cutter because it is very old method and many overcome produced from this type lawn cutter [2]. The self-powered design objective is to come up with a mower that is portable, durable, easy to operate and maintain. It also aims to design a self-powered mower of electrical source; a cordless electric lawn mower. The heart of the machine is a battery-powered dc electric motor. It is also useful method for our lawn mower. It is similar to our lawn cutter using display and keypad [3]. 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 linear 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. In case of any obstacles in the path it is sensed by using an IR sensor.

1.3. Problem identification

A Solar Grass Cutter is a machine that uses a revolving blade or blades to cut a lawn at an even height. Lawn mowers employing a blade that rotates about a vertical axis are known as rotary mowers, while those employing a blade assembly that rotates about a horizontal axis are known as cylinder or reel mowers. Many designs have been made, each suited to a particular purpose. The smallest types, pushed by a human, are suitable for small residential lawns and gardens, while larger, self-contained, ride-on mowers are suitable for large lawns, and the largest, multi-gang mowers pulled behind a tractor, are designed for large expanses of grass such as golf courses and municipal parks.

The problems with available grass cutter robots are

1. Power consumption:

The available grass cutter are petrochemical powered or electrical powered which will consume large amount of conventional energy Source.

2. Human effort:

The mowing work always needs to get control with a worker for the proper mowing.

3. Time consumption:

For mowing the land in different patterns and design it takes larger time and human effort

4. Safety.

2. METHODOLOGY

The Solar grass robot is made up of an induction motor, a battery, an alternator, three collapsible blades, and a link Mechanism. The power and charging system comprises of an alternator which charges the battery while in operation. The D.C. motor forms the heart of the machine and provides the driving force for the collapsible blades. This is achieved by the combined effect of mechanical action of the cutting blades and the forward thrust of the mower. The system is powered by an electrical switch which completes the circuit comprising the induction motor and the battery. The IR sensor is finding the path to avoid the obstacles and machine damage. The shaft fitting mechanism with which the height of cut is altered.

2.1 Components list

Table 1: Components list for solar grass cutting robot

S.no	Item	Quantity	Remark
1.	DC motor	2	Rotating the wheel
2.	DC motor	1	Rotating the blade
3.	Wheel	4	Moving the robot
4.	Battery	1	Power supply for motors
5.	Solar panel	1	Power supply for batteries
6.	IR sensor	1	Obstacle detection
7.	Collapsible blade	3	high carbon steel resist wear

2.2 Design Concept

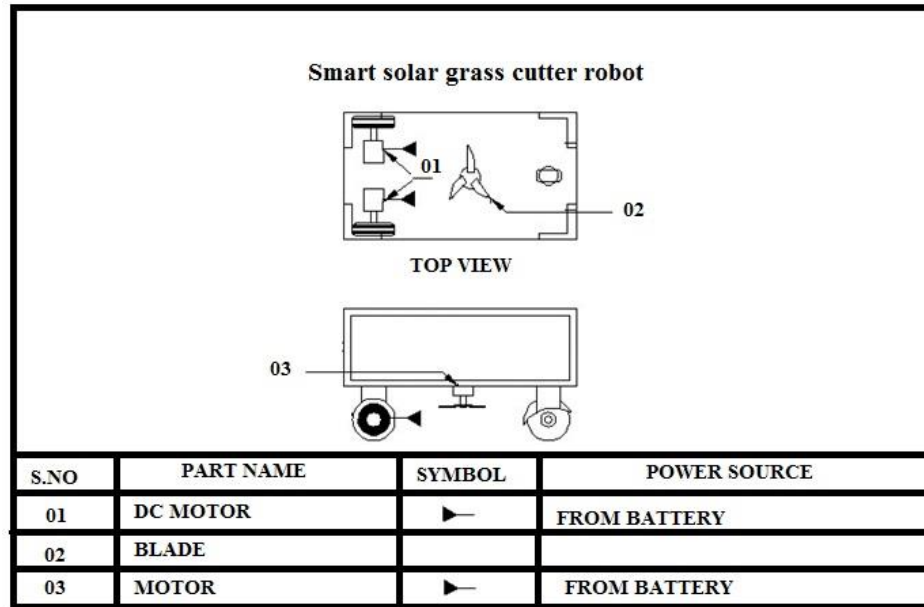


Fig 2 Orthographic view of the solar grass cutting robot

3. Operation principle

Electrical energy of the battery is converted to mechanical energy through a set of blades designed to achieve cutting operation. The electric circuit ensures power transfer from the battery to run the D.C. motor, whilst the solar panel power to continuously recharge the battery while in operation. The cutting blades tap power from the D.C. motor. When the power switch is on, the electrical energy from the battery powers the motor which in turn actuates the blades. The solar panel generates current to recharge the battery, thereby compensating for the battery discharge. The rotating blades continuously cut the grass as the mower is propelled forward and the cut grass. Height of cut is adjusted by means of the link mechanism via the lift rod.

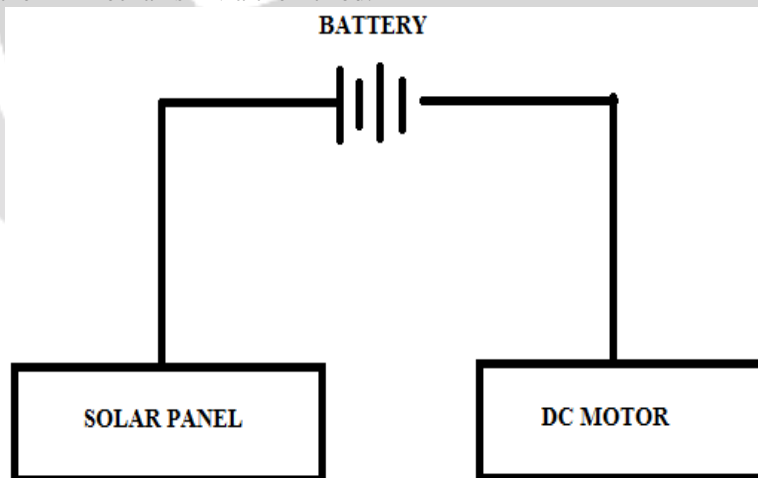


Figure 3: Circuit diagram of the solar grass cutting robot

4. Advantages and limitations

4.1 Advantages

- ❖ Easy to move from one place to another place .
- ❖ Compact size and portable
- ❖ Easy to move from one place to another place

- ❖ Operating principle is simple.
- ❖ Non-skilled person also operate this machine .

4.2 Limitations

- ❖ Large time required to remove the grass
- ❖ Manually operated
- ❖ Difficult to operate in rainy seasons

4.3 Application

- ❖ For cricket ground.
- ❖ The football ground.
- ❖ All garden
- ❖ All Playground


5. CONCLUSIONS

Robotics is very vast field which comes with different combinations of technology this will helps to reduce the human effort and gives maximum efficient output for the work, Nowadays lot of energy is wasted for mowing lawn in different areas of the world and also takes lots of human effort for the work. The main aim of this project is to make a solar powered automated robotic lawn mower system which will helps to mows the lawn in different design with lesser human effort. Advantages of this system are used components are of low cost so and in bulk production and adding of few more sensors doesn't makes any difference. but the disadvantage is that sometimes response of the system is too slow so in real time high end DSP processors is recommended that can process much faster.

6. REFERENCES

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BIOGRAPHIES (Not Essential)

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