

SHREWD AUTOMATED RIDING MOWER WITH LAWN COVERAGE

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Abstract

“Any technology becomes out dated and obsolete the day it is developed.” Rapid growth of various advanced tools and equipment makes our jobs done comfortable and complicated. The project aims at fabricating a grass cutting machine system that creates the grass cutter based motor running through alternative energy. Power plays a superb role wherever man lives and works. The living customary and prosperity of a nation vary directly with the increase inside the utilization of power. The electricity demand of the world is increasing at degree ugly rate because of industrial growth, accumulated and comprehensive use of electrical gadgets. The foremost effective totally different offer is solar energy.

Keywords - IR sensor, DC Motor, Solar panel, and linear blades

Introduction

Grass cutter machines became extremely popular nowadays, commonest machines are used for soft grass furnishing. Currently a days there are millions of development work has been unfinished however there are still some labour power which needs millions of financial gain distribution for a tiny low work. Therefore this {can be} needed that some work ought to have another different in order that the labour power wastage can be avoided. Therefore in our project we tend to are attempting to create a daily purpose mechanism that is ready to chop the grasses in field. The project work are done per the correct application primarily based fabrication. The system can have some automation work for steerage and different obstacle detection. The system can have an influence supply that's battery and an electrical device are hooked up on the highest of the mechanism. Moving the grass cutters with a typical motor powered grass cutters is associate inconvenience, and nobody takes pleasure in it. Cutting grass can be simply accomplished by

old, younger, grass cutter moving with engine produce pollution because of the loud engine, and native pollution because of the combustion within the engine. Also, a motor powered engine needs periodic maintenance such as dynamical the engine oil even supposing electrical star grass are environmentally friendly, they can also be associate inconvenience together with motor power-driven grass cutter, electrical grass cutters also are unsafe and can't be simply employed by all. Also, if the electrical grass cutter is twilled, mowing might encourage be problematic and dangerous. The paradigm will be are going to be charged from sun by exploitation star panels.

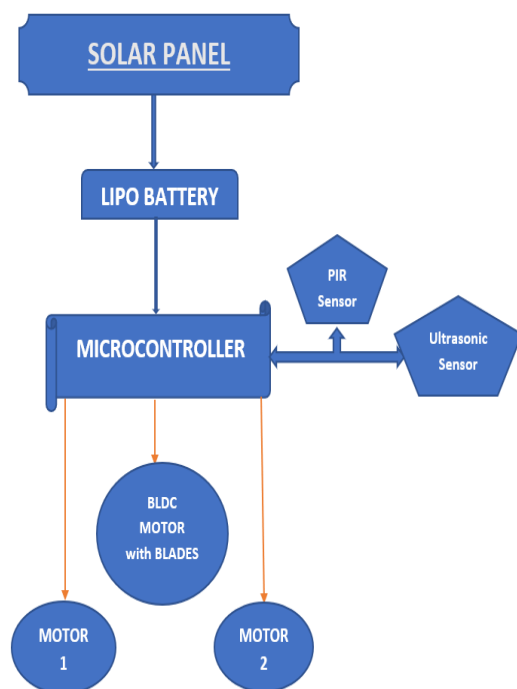


Figure 1: Block diagram of model

Literature Review

For planning of Automatic field Cutter we have a tendency to referred numerous literature, papers etc. The review of previous technique used given below: During this garden tool uses associate degree star primarily based energy supply, that is simpler to use, a lot of advantageous comparison to different energy supply particularly for gas primarily based supply of power.

[1] Grass Cutting Machine by Solar Energy Power by E. Naresh, G. Rahul. This paper gave the idea about the implementation of grass cutting machine by using the application of Manufacturing and Assembly (MA) methodology. The scope based on the existing grass cutting machine and the appropriate of MA methodology. The

method used for gaining the data is from the reassembled the existing grass cutting machine.

[2] Solar Powered Automatic Grass Cutter by Argade Pratik Pralhad, Bhosale Swapnil Bhagwan, Khadke Sagar Subhash are mainly proposed an automated system for the purpose of grass cutting. The source is drive from the solar energy by using solar plate. The system control is done by the Arduino UNO R3. Automation is achieved by using sensors and Arduino UNO R3.

[3] P. Amrutesh B. Sagar, B. Venu published a paper on Solar Grass Cutter with Linear Blades by using Scotch Yoke Mechanism.

[4] Design and implementation of a control algorithm for an autonomous lawnmower by Jason Smith, S. Campbell, J. Morton presents the design and implementation of a GPS-aided autonomous lawn mower. The lawn mower is an integrated system of sensors, motors, processors, and control software. A key position sensor is a unique custom designed and implemented differential GPS (DGPS) system that utilizes low-cost off-the-shelf standalone GPS receivers.

[5] "Smart Solar Grass Cutter Robot for Grass Trimming" by Ashish Kumarchaudhari, Yuvraj Sahu, Pramod Kumarsahu, Subhash Chandra Verma. They gave us the idea that we can charge the battery 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.

[6] Design and Implementation of Automatic Lawn Cutter by Pratik Patil, Ashwini Bhosale. The main objective of this automatic lawn cutter is that the user can specify the area that is to be mown and also the height of grass as per there requirement by using the keypad. The different sensors are used it will detect and avoid objects and humans while mowing.

[7] The solar entrepreneur's handbook, Wise Publications. This book brings together all the skills required to run a successful solar business in either a rural area or in a city. It is aimed at the person who wants to start a new renewable energy business in a developing country. It provides all the basic information required to get started. It also provides information on how to grow your business and to develop your technical skills and business skills further.

Focus of Project

Grass cutter machines became very hype these days. Most typical machines are used for soft grass furnishing. Currently a days there are a lot of development work has been unfinished however there are still some labor power which needs a lot of financial gain distribution for a little work. Thus are often needed that some work ought to have another various so the labor power wastage can be avoided.

So in our project we have a tendency to be attempting to create a daily purpose automaton that is ready to chop the grasses in field. The project work are going to be done in line with the correct application primarily based fabrication. The system can have some automation work for steering and alternative obstacle detection. The system can have an influence supply that's battery and a solar array are going to be hooked up on the highest of the automaton. Moving the grass cutters with a typical motor high-powered grass cutters is an inconvenience, and nobody takes pleasure in it. Cutting grass cannot be simply accomplished by old, younger, grass cutter moving with engine produce pollution thanks to the loud engine, and native pollution thanks to the combustion within the engine. Also, a motor high-powered engine needs periodic maintenance like ever-changing the engine oil. Even supposing electrical star grass are environmentally friendly, they can also be an inconvenience. Together with motor high-powered grass cutter, electrical grass cutters are dangerous and can't be simply employed by all. Also, if the electrical grass cutter is twilled, mowing may convince be problematic and dangerous. The image also will be are going to be charged from sun by victimization star panels.



Figure 2: Smart Solar Grass Cutter With Lawn Coverage
 Source: <http://www.robert-smith.net/my-projects/how-to-build-a-rc-lawn-mower/>

Problem Identification

A star Grass Cutter may be a machine that uses a revolving blade or blades to chop a field at a good height. Field mowers using a blade that rotates a few vertical axis area unit called rotary mowers, whereas those using a blade assembly that rotates a few horizontal axis area unit called cylinder or reel mowers. Several styles are created, every suited to a selected purpose. the littlest varieties, pushed by a person's, area unit appropriate for little residential lawns and gardens, whereas larger, self-contained, ride-on mowers area unit appropriate for big lawns, and therefore the largest, multi gang mowers force behind a tractor, area unit designed

for big expanses of grass like golf courses and municipal parks.

The issues with accessible grass cutter robots area unit

- 1. Power utilization:** The accessible grass cutter area unit organic compound powered or electrical powered which can utilize great amount of standard energy supply.
- 2. Human effort:** The mowing work perpetually must get management with a employee for the correct mowing.
- 3. Time consumption:** For mowing the land in numerous patterns and style it takes larger time and human effort
- 4. Safety:** Persons using a mower should wear heavy footwear, eye protection, and hearing protection in the case of engine-powered mowers.

Methodology

The star grass mechanism is created of an induction motor, a battery, a generator, 3 foldable blades, and a link Mechanism. The ability and charging system contains of n generator that charges the battery whereas operative. The D.C. motor forms the center of the machine and provides the thrust for the foldable blades. This is often achieved by the combined impact of mechanical action of the cutting blades and therefore the forward thrust of the lawn mower. The system is high-powered by associate control that completes the circuit comprising the induction motor and therefore 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.

Components

Table 1: Components list for solar grass cutting robot

| S.no | Items | Quantity | Remark | Specifications |
|------|-------------------|----------|-------------------------------|-----------------------------|
| 1. | DC motor | 2 | Rotating of the wheel | MI2980 -1 |
| 2. | DC motor | 1 | Rotating of the blade | MI2980 -5 |
| 3. | Wheel | 4 | Moving of the robot | 3/8" -16 |
| 4. | Battery | 1 | Power supply for motors | 36V and a capacity of 180Wh |
| 5. | Solar panel | 1 | Power supply for batteries | 12V |
| 6. | IR sensor | 1 | Obstacle detection | GP2Y0A21YK0F |
| 7. | Collapsible blade | 3 | High carbon steel resist wear | 21" or 22" blade |

Design Concept

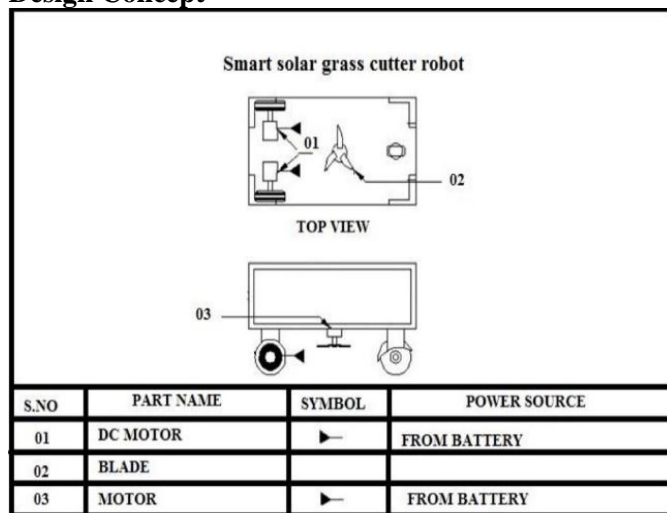


Figure 3: Orthographic view of the solar grass cutting robot
Source: Smart Solar Grass Cutter Robot for Grass Trimming [5]

Operational Principle

Electrical energy of the battery is regenerate to energy through a collection of blades designed to realize cutting operation. The electrical circuit ensures power transfer from the battery to run the D.C. motor, while the solar array power to unceasingly recharge the battery whereas operating. The cutting blades faucet power from the D.C. motor. Once the facility switch is on, the electricity from the battery powers the motor that successively actuates the blades. The solar array generates current to recharge the battery, thereby compensating for the battery discharge. The rotating blades unceasingly cut the grass because the lawn mower is propelled forward and also the cut grass. Height of cut is adjusted by means that of the link mechanism via the carry rod.

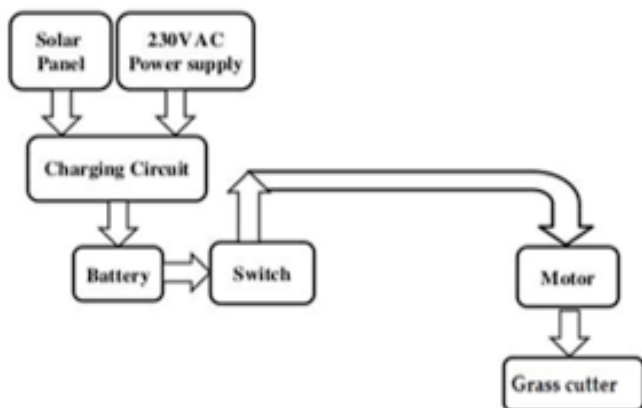


Figure 4: Circuit diagram of the solar grass cutting robot
Source: Design and implementation of a control algorithm for an autonomous lawnmower [4]

Advantages and Limitations

Advantages

- Easy to move from one place to another.
- Compact size and portable.
- Operating principle is easy.
- Non-skilled can additionally operate this machine.

Limitations

- Excess time is required to clean grass from the mowed area by robot.
- Manually operated.
- Cannot be operated in rainy season.

Application

- For cricket ground.
- The football ground.
- All gardens
- All Playgrounds

Conclusion

Robotics is incredibly large field that comes with completely different mixtures of technology this can helps to cut back the human effort and provides most economical output for the work, today heap of energy is wasted for mowing field in several areas of the planet and conjointly takes ample human effort for the work. The most aim of this project is to form a star hopped-up machine-controlled robotic garden tool system which can helps to mows the field in several style with lesser human effort. Benefits of this method area unit used elements area unit of low value therefore and in bulk production and adding of few a lot of sensors doesn't makes any distinction. However the disadvantage is that typically response of the system is simply too slow therefore in real time high finish DSP methods is suggested which will process abundant quicker.

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