

Smart Solar Grass Cutter

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ABSTRACT

From the time immemorial, the sun is the major source of energy for life on earth used for heat and lighting. Nowadays, solar energy has been known as a renewable energy source. It is an alternative energy to that of fossil fuel and it can be collected from the renewable resources such as sun, wind and hydro. This paper introduces a new development of grass cutter, named as Smart Solar Grass Cutter, by using solar irradiance as a primary energy source with the presence of a solar panel. This grass cutter prototype is developed to reduce air pollutant and improve the current design specifically the blade position based on the previous studies. With current technology, this new prototype is designed as remotely controlled grass cutter using Arduino UNO. Smartphone is used as the remote controller. After developing an established prototype, the design analysis is carried out to be validate with the theoretical values to ensure that the prototype can be safely used. The Smart Solar Grass Cutter can operate more than two hours when the battery is fully charged. Based upon the results, the Smart Solar Grass Cutters reliable with high efficiency of the system compared to the previous studies. Therefore, it can be concluded that the prototype is reliable and environmentally friendly.

Keywords: Arduino, Grass Cutter, Solar System

I. INTRODUCTION

The conventional grass cutters have been widely used recently by workers in the gardening and agricultural industries. However, the manual grass cutters are consuming a lot of energy and producing air pollution which can directly affect the workers' health. The conventional grass cutters are also creating a high level of noise and vibration which can cause serious health issues such as grip strength, decreased hand sensation and dexterity, finger blanching or 'white fingers' and

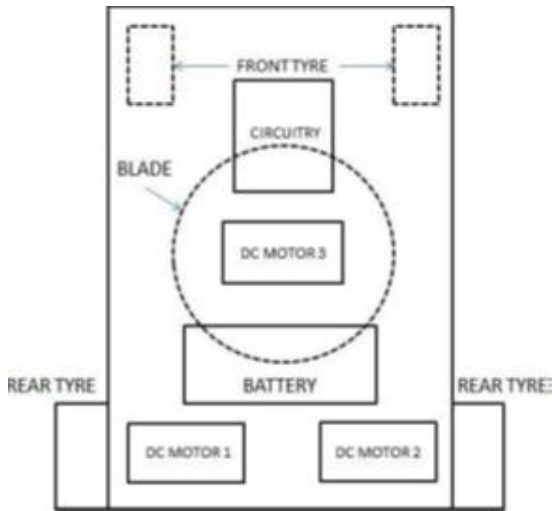
carpal tunnel. In order to address these issues, a new design of a grass cutter machine has been proposed. This device can be fuelled by solar energy and smartly controlled, which has been named as a Smart Solar Grass Cutter that has three main systems which are smart control system, solar system, and the grass cutter.

II. OBJECTIVE

The objective of this project is that to use renewable energy sources like solar power and to operate a cutter

equipped with various accessories (tool) to cut grass. The DC motor, powered by a battery, a spiral shaped grass cutting blade connected to the DC motor Directly.

- Schematic diagram of the smart solar grass cutter



COMPONENTS

1. Solar panel
2. Metal chase
3. Cutter Blades
4. Batteries
5. DC motor
6. Motor Driver
7. Drive wheel
8. Ultrasonic Sensor
9. Bluetooth
10. Arduino controller
11. Buzzer
12. Dume shaft
13. L Clamp metal
14. fitting clamp

III. WORKING

1. The solar panel receives solar energy from the sun, then it converts to the electrical energy which it stores to the battery. The solar panel is mounted on the top of the bot so it can easily get contact with the sunrays.
2. Ultrasonic sensor is mounted at the front of the bot which acts like eyes to the bot it is used to determine the obstacles. It detects obstacle then stops and takes turn.
3. In the device motor driver is provided to run the bot in any directions, the motor driver is connected with DC motors.
4. A high rpm DC motor is provided to the device which is used to cut the grass
5. It can also be handled by Bluetooth device as Bluetooth module is provided in the device.
6. battery can also be charged using electrical energy so device can be used in any wheather.

IV. ADVANTAGES

1. No long wires required.
2. Compact Design and easily Moveable
3. No fossil Fuel required
4. It has Less maintenance & anyone can operate
5. It has pollution free & it can Eco-friendly

V. APPLICATION

It is useful for cutting grasses in Farms, Gardens, Stadiums, College Grounds, Lawns and many more.

VI. CONCLUSION

A workable smart solar grass cutter prototype is focusing on the renewable energy as the primary sources of energy has been successfully fabricated with high working efficiency. Therefore, it can be concluded that the developed design of the proposed Smart Solar Grass Cutter has achieved the main

objectives and it can be further developed by industry. Smart Solar Grass Cutter is able to reduce the air pollution and also it is a user-friendly device. The grass cutter is suitable to be used for small application due to the shortest operating time, but it is not suitable for tall height grasses. For future work, there are few recommendations can be made to develop a better device. Instead of using polycrystalline solar panel, it is better to use mono-crystalline solar panel due to the high efficiency. The motor for the blade should have both high speed and torque. Higher capacity of rechargeable battery can lead to more operating time. Lastly, few types of blade to be considered to cut different types of grasses.

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