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Smart Solar Grass Cutter with Lawn Coverage

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Abstract

Currently, it is normal practice to cut grass over fields using a manually operated instrument, which results in pollution and energy loss. Cutting grass in lawns will take less effort with a solar-powered robotic solargrass cutter which is accessible from all angles via a smartphone app. It is made of an Arduino ATmega328p microprocessor, an ultrasonic sensor, a solar panel, and dc motors. This gadget uses a solar-based energy source, which is more practical and advantageous. Our invention comprises of a linear blade that is driven by a motor, and the power supply for the motor is provided by a rechargeable battery. This device will be crucial in the globaleconomy in the future.

Key words: Arduino UNO, DC Motor, Node MCU, Linear Blade, solar Panel.

Introduction

The biggest problem facing the world today is pollution. Gas-powered lawn mowers are guilty of causing pollution because they emit gases. Additionally, it is inefficient due to rising fuel prices. Traditionally, lawn mowers have been heavy, labour-intensive machines that require a lot of force and energy to operate. But these modern, high-tech grass cutters have been cleverly created to make the user's experience with landscaping considerably simpler and easier. The Grass Cutters employ clean, renewable energy produced by solar panels mounted on our trucks and trailers to power cordless electric mowers, trimmers, and blowers.

For smaller, more difficult-to-access locations like parks and pathways, we also employ reel push mowers. There is no pollution and no oil. Just fresh air, quieter surroundings, and lush grass. Grass cutters are now absolutely necessary to keep up the gardens and yards. Due to inaccuracy and incorrect cutting, manual grass cutting cannot adequately prepare beautiful gardens and playgrounds; consequently, automated machines are needed for grass cutting operations. Grass cutter, created in this work, is a fully remote-

controlled robotic vehicle without human intervention.

Methodology

The prototype is composed of an induction motor, a link mechanism, two retractable blades, a battery. The D.C. motor, which powers the foldable blades, is the engine of the device. By combining the effects of action and the forward push produced by the mower's blades and cutting action, respectively, the driving force is produced. When they are operating, the charging and power system's alternator charges the battery

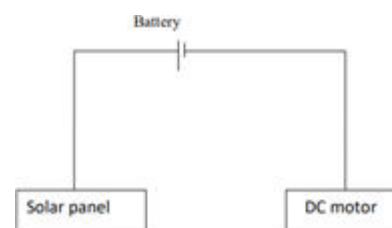


Fig.1 Methodology

The prototype's basic design is that it has panels arranged in a certain way so that it can efficiently receive high-intensity solar radiation. Typically, the Panels are positioned at a 45-degree angle to the sun. Solar panels are used to transform solar energy into electrical energy. With the aid of a solar charger, the electrical energy converted will be stored in

batteries. The main goal of using a solar charger is to increase the current coming from the panels while the batteries are being charged. It also assists in automatically connecting the solar panels when the batteries are low on charge and in separating the batteries from the panels when they are fully charged. A motor driver circuit that regulates the motor performance is used to connect the motor. Wire connections are used to join the motor and the motor driver circuit. The motor driver circuit facilitates the starting and stopping of the motors. The power is transferred to the motor, which causes the blade to revolve quickly and cut the grass evenly. The microprocessor manages the cutter and the motors. Once the microcontroller has received the code, it generates an IP address that is utilized by the mobile application that we use. We can control the entire gadget via the smartphone app.

Design

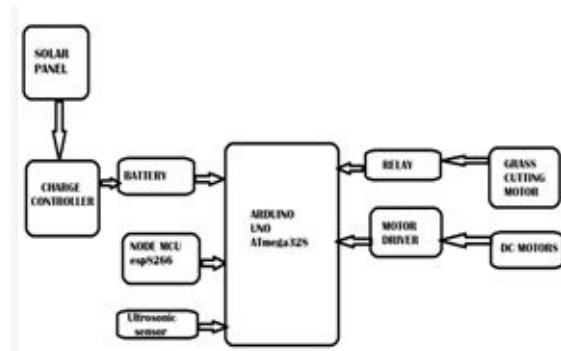


Fig 2: block diagram

Block diagram consist of following components:

1. Arduino UNO
2. Ultrasonic sensor
3. Battery
4. Relay
5. Grass cutting motor
6. DC motors
7. Node MCU
8. charge controller
9. Motor driver

Result



factor	Conventional grass cutter	Remote controlled grass cutter
effort	more	less
noise	more	Pollution free
Remote controlling	not available	available
pollution	more	less
efficient	less	more
maintenance	more	Less

Table-1: Comparison of Automatic Solar Grass Cutter with Conventional Grass Cutter

Conclusion

As we know robotics is a vast field that has different combination of technology, this will also help to reduce human effort and helps in providing maximum efficient output. Advantages of this device are bulk production and low cost; one disadvantage is that sometimes it responds very slowly. Now-a-days lots of energy are wasted in moving such device also requires lots of human effort. By using this kind of system, we can preserve some of our non-renewable resources of energy such as gasoline, petrol, etc. various types of pollutions like air pollution, noise pollution can also be reduced by using this system. As we use abundantly available solar energy as the source, we also save electricity.

Future Scope

This device/ system is useful at the basic level of grass cutting. As we have a disadvantage that this device might not

cut the grass at the places where some obstacles are present some improvements can be done in future. so that the grass cutter will become more flexible. Such improvements are mentioned below.

- ❖ Image capturing technology can be used. To differentiate the obstacles and grass.
- ❖ Automatic adjust of the blades with respect to different working space.

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