

Solar Operated Grass Cutter

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ABSTRACT

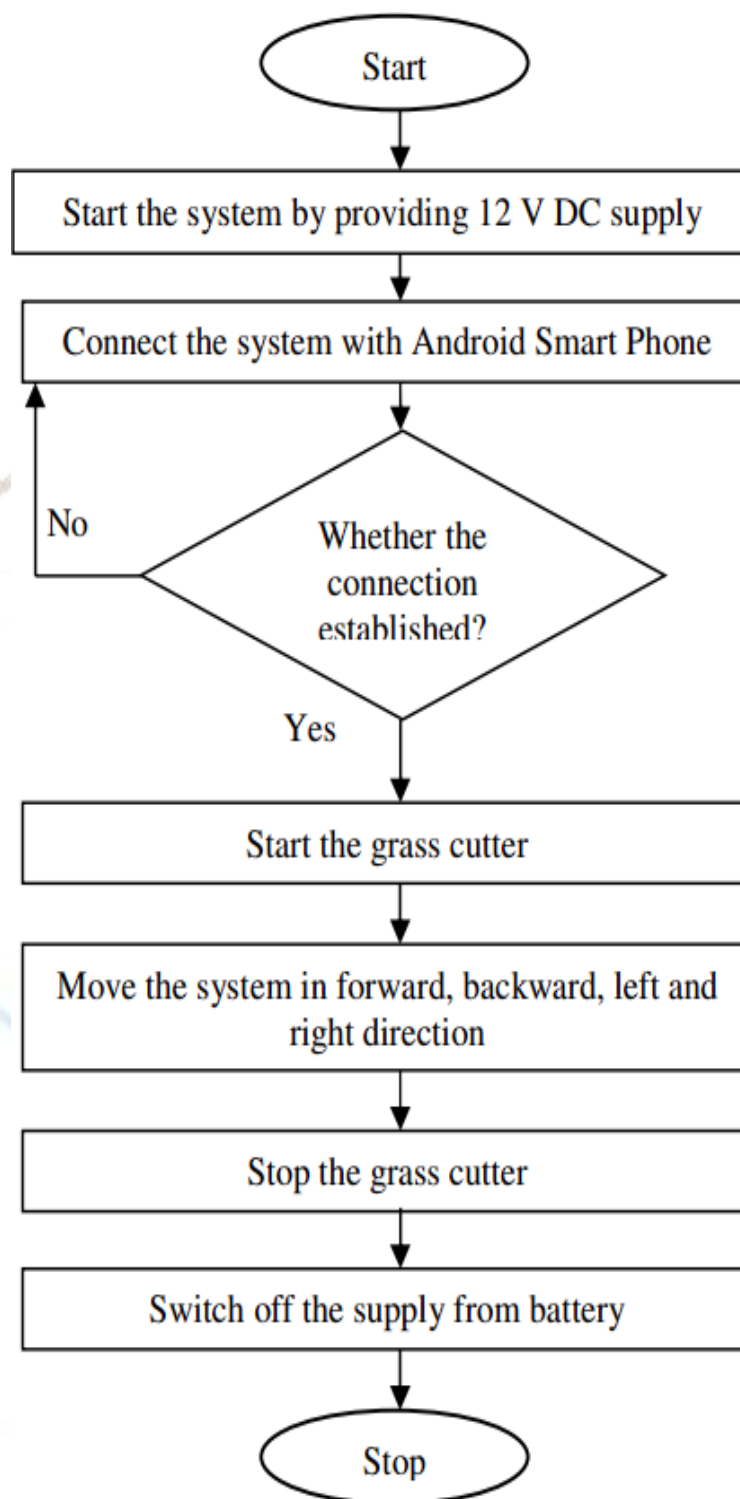
This project presents the development of a solar-operated grass cutter using Arduino technology. With increasing environmental concerns and the need for sustainable solutions, solar-powered devices are becoming more popular. The aim of this project is to create an eco-friendly grass cutting machine that utilizes solar energy as its primary power source. The system consists of a solar panel array to harness solar energy, an Arduino microcontroller for control and automation, and a grass cutting mechanism. The solar panel array converts sunlight into electrical energy, which is then stored in batteries for later use. The Arduino microcontroller manages the operation of the grass cutter, including the activation of the cutting mechanism based on predefined parameters such as time of day or grass length. The cutting mechanism comprises a motorized blade or a nylon wire cutter, which is activated by the Arduino controller. The device can be programmed to operate autonomously, cutting grass at specified intervals or upon command via a remote control. The project aims to provide a sustainable and efficient solution for grass cutting tasks, especially in areas where access to traditional power sources may be limited. By harnessing solar energy and utilizing Arduino technology for automation, the solar-operated grass cutter offers an environmentally friendly alternative to conventional gas-powered or electric lawn mowers.

Keywords: Solar energy, Arduino, Grass cutter, Automation, Sustainability

INTRODUCTION

Nowadays, lots of people use grass cutting machines, mainly for trimming soft grass. We often deal with pollution, especially at home. Here, we introduce a new model of a grass-cutting machine that works on solar power, which is renewable. This machine can cut the grass on its own without needing someone to operate it. Our model reduces both environmental and noise pollution. It's a modern solution to an old problem, benefiting both nature and the user. By using solar power to operate the machine, we can save users from the hassle of mowing their lawns and reduce noise and pollution. The aim is to offer a green alternative to the commonly used fuel-powered lawnmowers, making life easier for users while helping the environment. We hope to continue improving the project until we have a fully functional and efficient product.

1)Flowchart

**Fig. 1.** Flowchart of System

2)BLOCK DIAGRAM

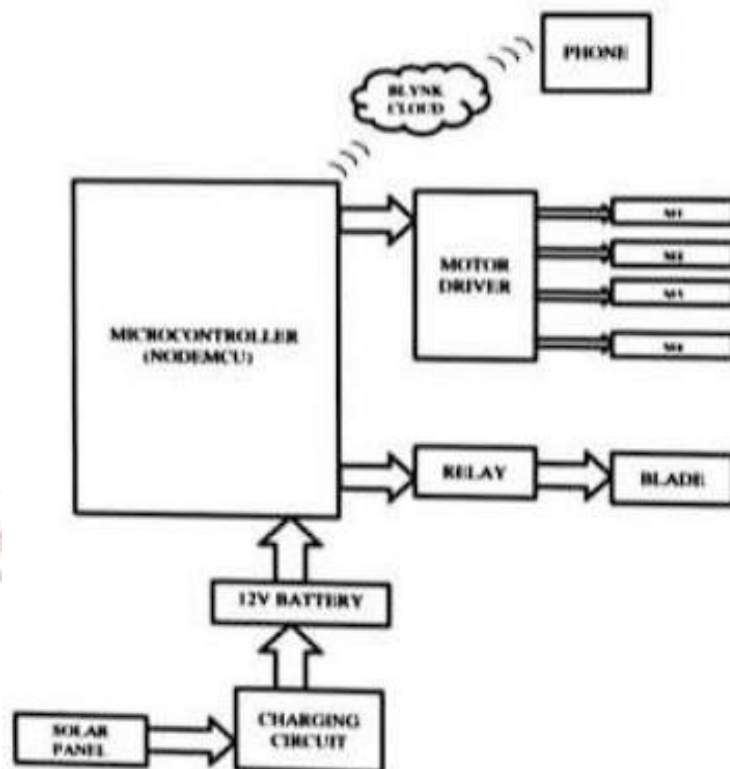


Fig 2.block diagram

Component name: -

1. Arduino
2. DC motor
3. Solar panels
4. Batteries
5. Solar charger
6. Ultrasonic sensor
7. Nylon wire
8. Motor driver
9. Wheel
10. Bluetooth module

1.Kit

The platform for embedded systems is open source. An Arduino family microcontroller is interfaced with the vehicle's motors and the lawn cutter to regulate the operation of each motor. Comparing the controller to other microcontrollers, it is more affordable and efficient and has 28 pins. The Arduino Windows software can be used to test any new C++ language code initially. After that, this code may be loaded into the Arduino platform by connecting the Arduino kit and PC using a straightforward USB cord. The Arduino is depicted in image.



Fig.3. Arduino

2. Motor

DC Motor Four 12-volt DC motors are used in this arrangement, and each motor is coupled to four wheels. Through the shaft's rotation, this motor transforms DC electrical input into mechanical energy. Compared to other motors of a similar kind, this one is less expensive and requires less electrical voltage to operate. The DC motor is depicted in figure 4 below. DC gear motor converts electrical energy into mechanical energy through the interaction of magnetic fields and mechanical gearing. The electromagnetic force generated by the interaction of the armature and fixed magnets causes the armature to rotate, while the gear mechanism controls the speed and torque of the output shaft. This makes DC gear motors useful for a wide range of applications requiring controlled and precise mechanical motion.



Fig.4.DC Motor

3.Solar Panel

The solar panel in this construction is 10 Watts, 12 volts. In this gadget, two batteries are employed. One is utilized to power the DC engines, and the other is employed to manage the lawn cutter's engine. The aluminum frame is covered in tempered glass material on both sides. This panel is made entirely of monocrystalline silicon. Batteries that are installed on top of the machine are charged using solar panels. Compared to other panels, this one is more affordable, lightweight, and small. This robot's lawn cutter is based on a solar panel. To locate the obstruction, we include the infrared sensor. The cutter machine is stopped by the IR sensor if an object is in front of the robot.



Fig.5. solar pan

4.Battery



Fig.6.Battery

Chemical energy is immediately converted to electrical energy by batteries. A battery is made up of many voltaic cells. The chemical processes in these voltaic cells are caused by specific chemical compositions. Every cell is made up of two half-cells joined by a conductive electrolyte that has cations and anions in it. Electrolyte and the negative electrode, to which anions (negatively charged ions) migrate, are components of one half-cell; electrolyte and the positive electrode, to which cations (positively charged ions) migrate, are components of the other half-cell. Redox reactions power the battery. Cations are reduced (electrons are added) at the cathode during charging, while anions are oxidized (electrons are removed) at the anode during charging. During discharge, the process is reversed. The electrodes do not touch each other, but are electrically connected by the electrolyte.

5.Cutter: -**Fig.7.Nylon Wire (Cutter)**

A nylon wire cutter is a tool designed to cut grass, cleanly and efficiently. The function of a nylon wire cutter is similar to that of other types of blade cutters, but it's specifically optimized for cutting grass on lawn without fraying or causing damage to the ends of the cord.

Sharp Blades: Nylon wire cutters typically feature sharp blades made from durable materials such as hardened steel or stainless steel. These blades are designed to slice through nylon material cleanly and smoothly.

Conclusion: -

This project provides a design method of an automated grass cutter operated on solar power, whose task is to cut grass with no need of user interaction. This task is expected to be made possible by using sensors to provide an Adriano with controlling. here for obstacle avoidance the ultrasonic sensor is used. 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.

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