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SOLAR GRASS CUTTER USING BLUETOOTH MODULE

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ABSTRACT

The Solar Grass Cutter using Bluetooth HC-05 Module is an innovative and eco-friendly solution designed to automate grass cutting while reducing human effort and environmental impact. Traditional grass cutters rely heavily on fuel or direct electrical power, which increases pollution and operational costs. This project introduces a solar-powered system integrated with a rechargeable battery and controlled remotely via Bluetooth communication.

The system uses a solar panel to harness renewable energy and store it in a battery, ensuring sustainable operation. The Bluetooth HC-05 module enables wireless communication between the user and the device through a smartphone application. The cutter is operated using DC motors, and movement is controlled via motor drivers. The system allows forward, backward, left, and right movement, providing flexibility and ease of use. The design focuses on energy efficiency, cost-effectiveness, and user convenience. The results demonstrate that the solar grass cutter operates efficiently under sunlight conditions and can be controlled effectively through mobile devices. This reduces dependency on fossil fuels and minimizes operational noise and pollution. In conclusion, this project presents a smart, sustainable, and user-friendly approach to lawn maintenance. It has potential applications in agriculture, gardens, and public parks. Future enhancements may include automation using sensors and AI-based navigation systems.

KEYWORDS: Solar Energy, Grass Cutter, Bluetooth HC-05, Renewable Energy, Automation, DC Motor

1. INTRODUCTION:

Grass cutting is an essential activity in agriculture, landscaping, and gardening. Conventional grass cutters depend on fuel-powered engines or direct electrical supply, leading to increased environmental pollution, high operational costs, and maintenance issues. With growing awareness about sustainable development, there is a need for eco-friendly alternatives.

The Solar Grass Cutter using Bluetooth HC-05 Module addresses these challenges by utilizing solar energy as a primary power source. This system reduces

dependency on non-renewable energy and provides a cost-effective solution. The integration of Bluetooth technology allows users to control the machine remotely using a smartphone, improving safety and convenience.

This project aims to develop a portable, efficient, and environmentally friendly grass cutting system that can be easily operated without manual effort.

2. Materials and Methods

Materials Used:

- Solar Panel
- Rechargeable Battery

- Arduino Uno Microcontroller
- Bluetooth Module (HC-05)
- Motor Driver (L298N)
- DC Motors
- Cutting Blade
- Wheels and Chassis
- Connecting Wires

METHODOLOGY

The solar panel collects sunlight and converts it into electrical energy, which is stored in a rechargeable battery. The battery powers the entire system.

The Arduino Uno acts as the central controller. It receives signals from the Bluetooth HC-05 module, which is connected to a smartphone application. Based on the commands (forward, backward, left, right, stop), the Arduino sends signals to the motor driver.

The motor driver controls the DC motors for movement and blade rotation. The cutting blade rotates at high speed to cut grass effectively.

3. RESULTS

The developed solar grass cutter was tested under different environmental conditions. The system successfully operated using solar energy and performed grass cutting efficiently.

- The Bluetooth control system worked smoothly within a range of 10 meters.
- The motors responded accurately to user commands.
- The solar panel effectively charged the battery during sunlight.
- The machine reduced manual labor and time consumption.

The performance shows that the system is reliable and efficient for small-scale grass cutting applications.

4. DISCUSSION

The project demonstrates a successful implementation of renewable energy in a practical application. The use of solar energy significantly reduces environmental pollution compared to traditional fuel-based cutters. Bluetooth control enhances usability and provides safety, as users can operate the machine from a distance. However, the system's efficiency depends on

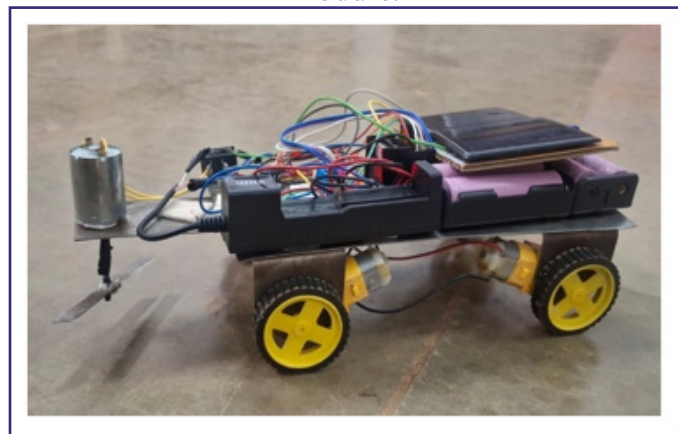
sunlight availability, which may limit performance during cloudy conditions.

The design can be further improved by adding sensors for obstacle detection and automation features such as AI-based navigation.

5. CONCLUSION

The Solar Grass Cutter using Bluetooth HC-05 Module is an effective and eco-friendly solution for grass cutting. It reduces pollution, saves energy, and minimizes human effort. The project successfully integrates solar power with wireless control, making it a smart and sustainable innovation.

Fig. 1.1: Solar Grass Cutter using Bluetooth Module.



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