



Automatic Solar Grass Cutter

Automatic and Requires less Human Interaction

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ABSTRACT:

This paper proposes an Automatic Solar Grass Cutter. This system utilizes an 89S52 microcontroller for core processing of project and Bluetooth for an input command for and microcontroller, while an LED display panel showcases the input information for grass cutter. The paper delves into the hardware design, including a custom power supply circuit, and explores potential communication protocols between the microcontroller and Bluetooth module. Software development aspects for the microcontroller are briefly addressed. This research contributes to the development of cost-effective and versatile digital signage solutions suitable for various public and private applications.

INTRODUCTION:

In an era characterized by a growing awareness of environmental sustainability and the desire for Labor-saving technologies, the Automatic Solar Grass Cutter emerges as a remarkable fusion of innovation and eco-consciousness. This cutting-edge device is designed to address the perennial challenge of lawn and Garden maintenance while harnessing the power of the sun to do so efficiently and autonomously. Now-a-days, pollution is that the major issue within the universe. Just in case Gas powered grass Cutter because of the emission of gases it's accountable for pollution. Conjointly the value of fuel is increasing Therefore it's not economical. Historically, grass cutter is usually gawky items of machinery that involves Heaps of strength and energy to use. These gift and high-tech grass cutters but, are creatively designed to form The complete landscaping method abundant easier and easier for the user. From robotic grass cutter that may Implausibly cut the grass for North American country to those who square measure smartly powered by Alternative energy, these convenient and easy to use. There is no oil, and no pollution.

Simply clean air, less Noise, and inexperienced grass. We tend to needed associate degree inaudible device to sense if the field Cutter was heading into associate degree object. Safety is that the main concern whereas coming up with the field cutter. Because it has blades we tend To needed our field cutter to not be in operational mode if it absolutely was being control within the air by the User. The field cutter we would have liked a device to notice orientation. The measuring instrument was Therefore utilized in field cutter so it will not operate once user hold it. Associate degree automatic field cutter Can relieve the consumer from mowing their own lawns by avoiding each environmental and sound pollution. The project used microcontroller, electrical motors, batteries, driver motor, and Bluetooth module, GPS. The Project has 3 classes particularly electrical, software and mechanical.

Electrical sections contain electrical Elements, batteries and motor. 12-volt three Ampere batteries square measure connected serial circuit. The Motive force motor controls the speed and direction of the grass cutter. The code sections deals with Development of the robot Application for wireless transmission and building program for the microcontroller. They used Application for developing associate degree application to manage the grass cutter. Mechanical Section deals with constructing the case and installing the wheels, blade and caster wheels of the grass cutter.

NEED OF THE STUDY:

- 1) Design and Implementation of Automatic Solar grass cutter: This project aims to design and implement an automatic solar grass cutter that uses solar energy to charge its battery and a sonar sensor to avoid obstacles.
- 2) Automatic Solar Powered Grasscutter: This paper introduces a solar grass cutter design that uses solar energy and has no moving parts, so it requires less maintenance. It also demonstrates how an Android operating system can control the grass cutter via Bluetooth.
- 3) Study on Automated Solar Grass Cutter: This study shows how technology can be used to reduce human effort and use renewable energy sources efficiently. The device uses a solar plate to deliver power, a battery to store solar energy, and a solar panel to charge the battery.
- 4) Automatic Solar Grass Cutter with Obstacle: This study discusses how a solar grass cutter with obstacle detector can be used for a variety of tasks. It also mentions that the device has a lower carbon footprint, requires minimal maintenance, and is economical in the long term.

RESEAAARCH METHODOLOGY:

- 1) Design of automatic solar grass cutter: The solar grass cutter consists of solar panel, charge controller, battery, DC motor, grass cutter blade. The whole system is placed on top of four wheels and plywood board. The front two wheels are revolving wheel so that the cutter can move according to the needed direction. The solar panel is placed at an angle of 45° due south to get the maximum intensity of solar radiation. The charge controller connects the battery and the panel and protects the battery from overcharging. The DC motor is connected with the battery. The blades are attached with the motor with bolt connection.
- 2) User Requirements and Specifications: Gather user requirements through surveys or interviews with potential users to determine their expectations, preferences, and constraints for the solar grass cutter.
- 3) Mechanical Design: Create detailed mechanical designs, including chassis, cutting mechanism, wheels or tracks, and safety features. Consider ergonomics and ease of use.
- 4) Navigation and Obstacle Avoidance: Develop algorithms and sensors for navigation and obstacle detection and avoidance. Ensure safe and efficient movement in the cutting area.
- 5) Data Collection and Analysis: Collect data on the grass cutter's performance, energy consumption, and user satisfaction. Analyze this data to make improvements.
- 6) Maintenance and Support: Establish maintenance procedures and provide customer support for troubleshooting and repairs.
- 7) Components:
 - I) Microcontroller(89S52):



8K Bytes of In-System Reprogrammable Flash Memory
 Fully Static Operation: 0 Hz to 24 MHz
 256 x 8-Bit Internal RAM
 32 Programmable I/O Lines
 Three 16-bit Timer/Counters
 Eight Interrupt Sources
 Programmable Serial Channel
 Low Power Idle and Power Down Modes

II) Ball bearing DC Motor:



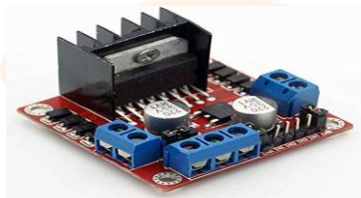
Motor Type: 775.
 Operating Voltage: 6~20Vdc. (Nominal 12Vdc)
 No Load Speed: 12,000 RPM @ 12V.
 Rated current: 1.2A @ 12V.
 Stall Torque: 79Ncm @ 14.4V.
 Cooling Fan: Internal
 Overall Size: 98x42mm.
 Shaft: Full Round Type Ø5mm.

III) Ultrasonic Sensor:



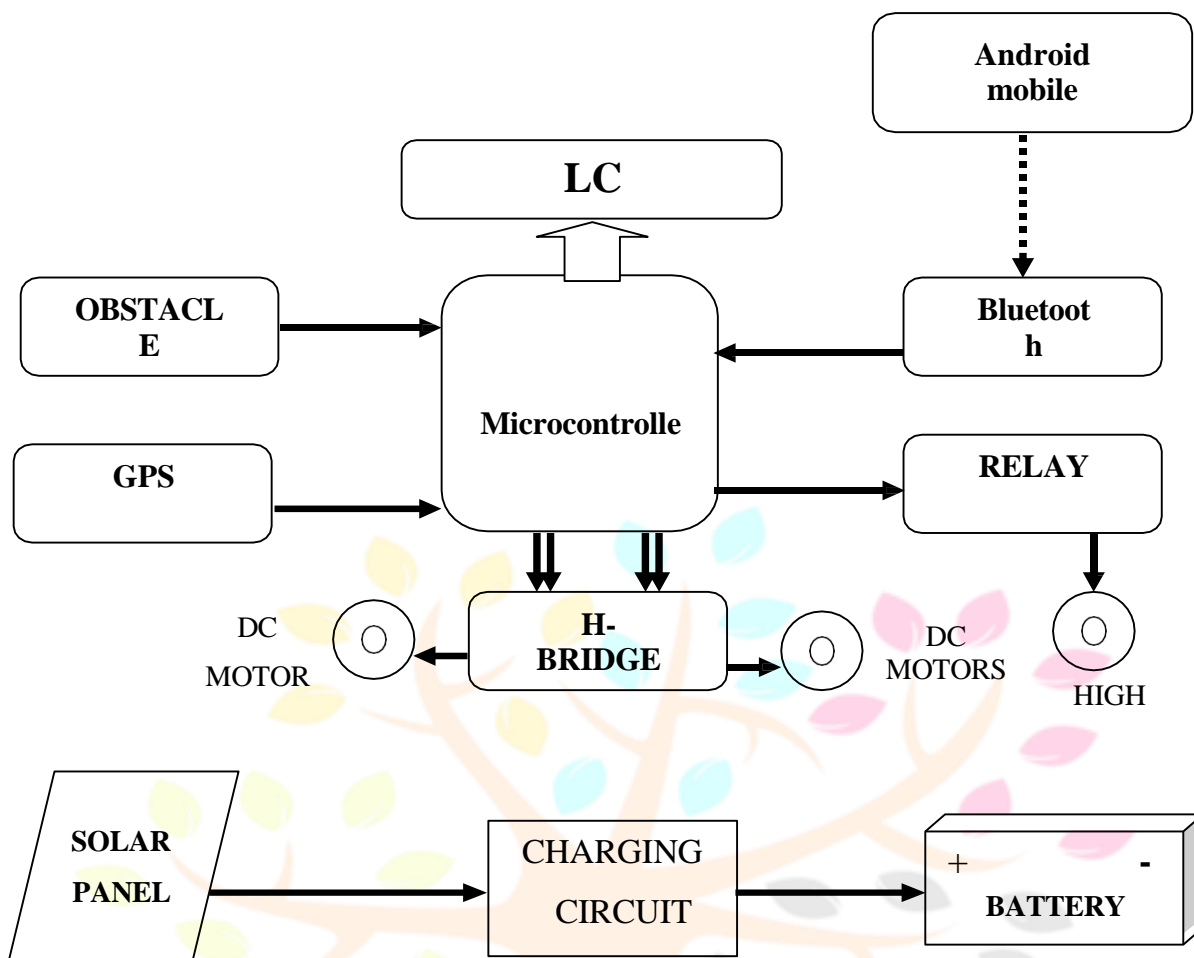
Operating Voltage = DC 5V
 Operating Current = 15mA
 Operating Frequency = 40KHz
 Max Range = 4m
 Min Range = 2cm
 Ranging Accuracy = 3mm
 Measuring Angle = 15 degrees
 Trigger Input Signal = 10µS TTL Pulse
 Dimension = 45 x 20 x 15mm

IV) L298 Motor Driver:

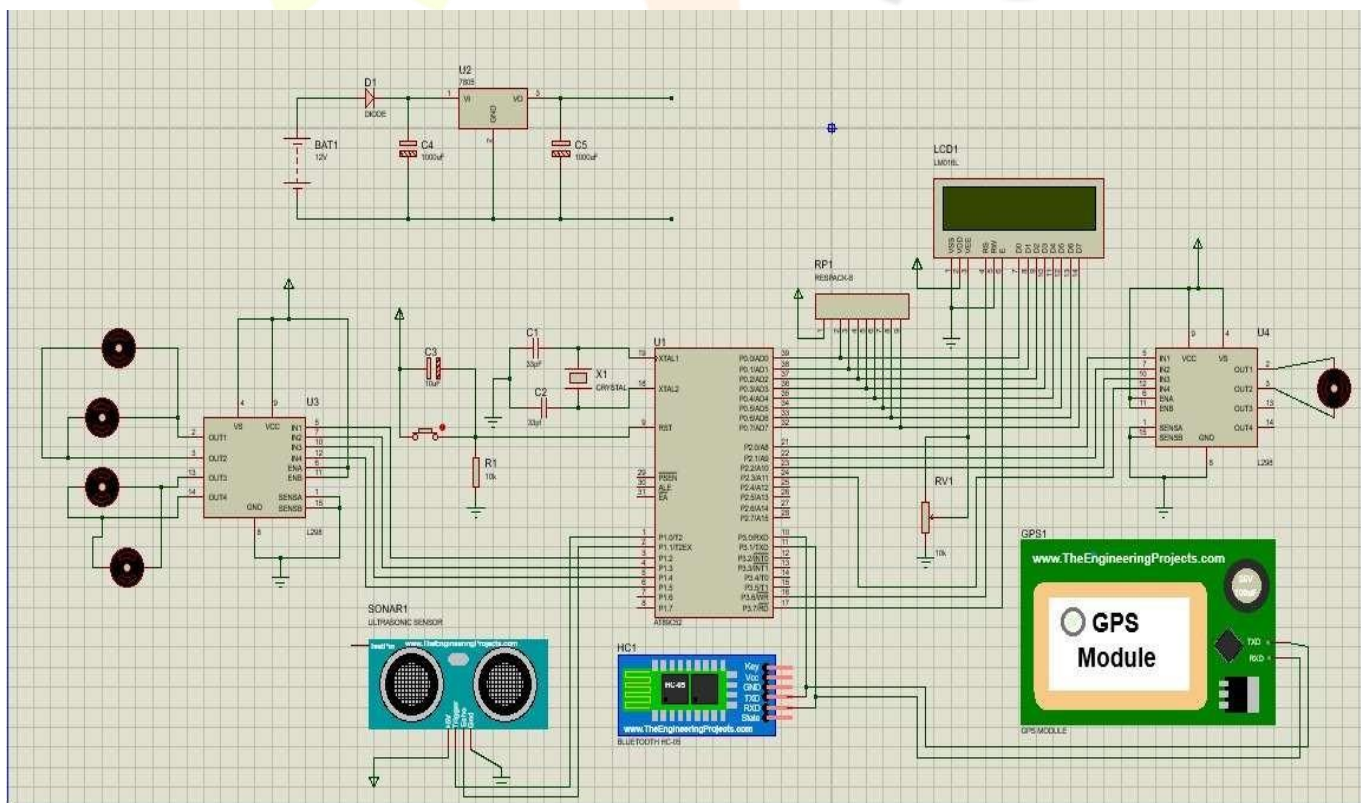


L298N is a high voltage, high current motor driver chip. The chip uses 15-pin package. The main features are: high voltage, maximum Operating voltage up to 46V; output current, instantaneous peak current Up to 3A, continuous operating current of 2A; rated power 25W. Contains two H-bridge high-voltage and high current full-bridge driver Can be used to drive DC motors and stepper motors, relays, coils and Other inductive load; using standard logic level signal control; having Two enable control terminal, in allows input signal without being Affected or disable the device has a logic supply input, the internal logic Circuit part of the work at a low voltage; can be an external sense Resistor, the amount of change back to the control circuit. Drive motor Using L298N chip, the chip can drive a two-phase stepper motors or four-phase stepper motor, can drive two DC motors.

BLOCK DIAGRAM:



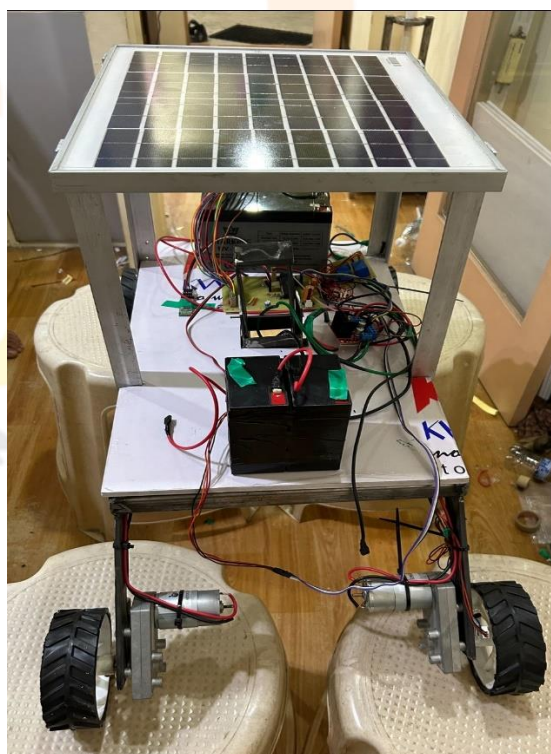
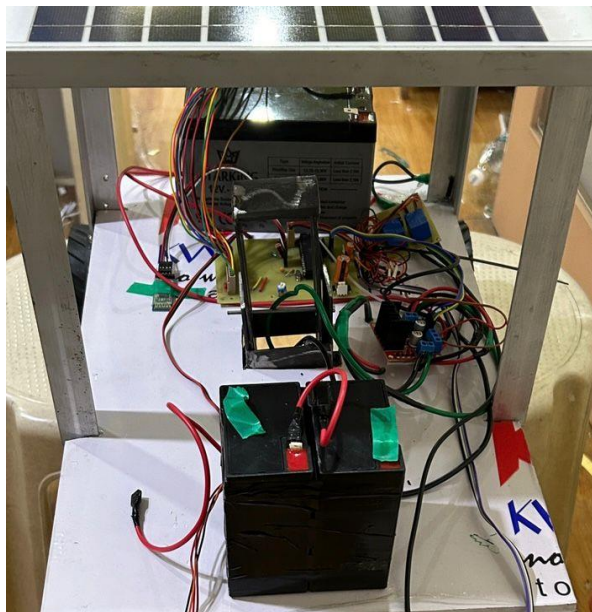
CIRCUIT DIAGRAM:



WORKING:

The solar grass cutter is a fully automated grass cutting vehicle powered by solar energy. Once an input is given using the Bluetooth module to the grass cutter, it cuts the grass to a specific length and breadth given by a user. It cuts the grass at a very high RPM. The solar grass cutting machine is a fully automated machine powered by solar energy. It also detects obstacles in the path based on that changes the movement direction.

The system uses 12v batteries to power the vehicle movement motors and 24v for grass cutting motor. Grass cutting equipment uses single or multiple blades to cut a grass surface up to a uniform height. Here, the height of the grass you should cut remains fixed. However, operators may adjust the grass-cutting device by using a single master lever or by the combination of a nut and bolt on each machine wheel.

HARDWARE PHOTO:

CONCLUSION:

An automatic solar grass cutter that uses Bluetooth can be controlled with an Android operating system to reduce human effort. The grass cutter uses solar energy, which is a more advantageous energy source than others. The solar panels generate electricity for free, which charges the battery for the grass cutting operation. The machine can be controlled in either automatic or manual mode, and the Bluetooth controller uses an Android application to control the machine's movement and direction

FUTURE SCOPE:

The solar panel can be fixed with light sensors. Thus depending upon the arrangement of the sun, the panel will be slanting, such that the sun rays are incident normally (at 90deg) to the solar panel. With this the device would be constant capable of trapping the solar energy at times when the strength of the sun light is less. If panel used of high watt, then the machine can be used during night time for garden lighting or room lighting, because we can accumulate more power. And at night time however you keep it apart. So the power in the battery can be used for this intention. By using one valve in the pipe we can also use it for gardening i.e. pouring water for plants. By connecting one box type transporter we can use it to transport files, books or other stuffs from one place to other in office or any other place. Grass cutting can be made more proficiently used after modifying for small rice harvesting.

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