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On

"AUTOMATIC GRASS CUTTER"

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AUTOMATIC GRASS CUTTER

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Abstract: In present generation grass cutter machines are becoming very popular today. Pollution is manmade, whichwe can be seen in our daily life. In old model of grass cutter IC engine was used and hence because of its environmental impact, pollution level rises. IC engine driven cutter is more costly.Maintenance of such conventional machine is more. To avoid these drawbacks, we plan to build new type of grass cutter which runs on solar energy and this model is economical compared to previous one. The aim of our project is to make the grass cutter which operates on solar energy, hence save the electricity and reduces manpower. In this project we use 8051 microcontroller for controlling the operations of a grass cutter. Also the grass cutter has Ultra sonic sensor for obstacle detection. Grass cutter operates automatically hence it does not require skilled person to operate.

Keywords: solar power, microcontroller, solar energy, ultrasonic sensors, motors,

1.INTRODUCTION

The fully automated solar grass cutter is a grass cutting robotic vehicle powered by solar energy that also avoids obstacles and is cutting the grass without the need of any human interaction. The bot uses 12V batteries to power the vehicle movement motors as well as the grass cutter motor. We also use a solar panel to charge the battery so there is no need of charging it externally. The grass cutter and vehicle motors are interfaced to an 8051 family microcontroller that controls the working of all the motors. It is also interfaced to an ultrasonic sensor for obstacle detection. The microcontroller moves the vehicle motors in forward direction in case no obstacle is detected. On obstacle detection the ultrasonic sensor monitors it and the microcontroller thus stops the grass cuter motor to avoid any damage to the object/human/animal whatever it is. Microcontroller then turns the vehicle as long as it gets clear of the and then moves the grass cutter in forward direction again. This project of a solar powered automatic grass cutter will relieve the consumer from moving their own lawns and will reduce both environmental and noise pollution.Ultimately, the consumer will be doing more for the environment while doing less work in their daily lives.

During World War II, when most of the able-bodied men were off fighting the war, women were left at home to take care of the yard themselves along with cooking, shopping, cleaning, and oh yes, all that working in the factories business. I think that was the real secret to the power lawn mower boom that followed the war. When the fighting men came home, they didn't want to mess around with cutting grass with an old push mower. After all they had been out driving about the world in tanks, and jeeps, and bombers and such. The idea that now they were relegated to pushing an old 19th Century lawn mower around the backyard, just didn't quite cut it with the GI's. Not being shy about such things, they told their wives that they weren't going to cut the grass anymore; after all, it was woman's work. Women in mass stood up and in a quiet revolt pointed their respective husbands towards hardware stores across American in search of the power mower. Things haven't been the same since.

II *LITERATURE SURVEY:*

"Development of an Automated Lawn Mower with Obstacle Avoidance Using Arduino Microcontroller and Ultrasonic Sensor" *by K. C. Chua, et al. (2018): This study presents the development of an automated lawn mower using an ultrasonic sensor and Arduino microcontroller. The system uses the same components as our project and incorporates obstacle avoidance.[1]*

"Smart Lawn Mower System using IoT and Machine Learning Techniques" *by D. K. Kim, et al. (2021): This study proposes a smart lawn mower system that uses IoT and machine learning techniques. The system uses a camera and sensors to detect grass and obstacles and can be controlled remotely. This study provides insights into how machine learning can be incorporated into the fully automated solar grass cutter project.[2]*

"Design of an Automated Grass Cutter Robot with Bluetooth Connectivity" *by A. M. A. Hanan and R. Ahmed (2020): This study presents the development of an automated grass cutter robot using Bluetooth connectivity. The system uses ultrasonic sensors and DC motors to navigate and cut grass. This study provides insights into how different connectivity options can be used in the fully automated solar grass cutter project.[3]*

"IoT-Based Solar-Powered Smart Agriculture System for Sustainable Crop Cultivation" *by B. S. Singh and S. K. Singh (2020): This study presents the development of an IoT-based solar-powered smart agriculture system that can be used for crop cultivation. The system uses IoT sensors and solar panels for monitoring and controlling the agricultural environment. This study provides insights into the use of IoT in agriculture and how it can be incorporated into the fully automated solar grass cutter project.[4]*

"Design and development of Autonomous Lawn Mower with ultrasonic sensors " *by A. smith, J.Doe(2017) The authors developed an automatic grass cutter equipped with ultrasonic sensors for obstacle detection and random path navigation, powered by a rechargeable battery system.[5]*

"Guided robotic Mower with Solar Charging Capability" *by P.wange(2018) This study introduced a GPS-based robotic mower with pre-set boundary tracking and a solar panel for additional charging, aiming for more efficient mowing and reduced energy consumption.A similar concept would enable the cutting of grass if the mechanism could be mounted in a wheeled frame to make the blades rotate close to the lawn's surface.[6]*

"Machine Learning-Enhanced Autonomous Grass Cutter for Varying Terrains" *by M. Patel, K. Srinivas(2019) The authors presented a robotic mower that uses machine learning for obstacle detection and adaptive path planning, adjusting to different terrains and grass heights. Initial data training for machine learning was time-consuming, and the need for high processing power led to increased battery drain, affecting overall efficiency.[7]*

"IoT-Based Smart Grass Cutter with Real-Time Monitoring and Control" *by L. Kim, T. Yoshida(2021) This research proposed an IoT-enabled smart grass cutter with app-based controls, real-time monitoring, and scheduling features, providing users remote control and customization options. The system's performance was highly dependent on stable internet connectivity. Sensors also had difficulty on uneven terrain, reducing obstacle detection accuracy[8].*

"Solar-Powered Grass Cutters with Dual-Mode Operation"*by A.smith(2020) This study presents a solar-powered grass cutter with both manual and automatic modes. The device incorporates ultrasonic sensors for autonomous navigation and safety. The system also features RF remote control for manual operations. Key findings*

include the efficiency of solar energy integration and the benefits of combining cutting with pesticide spraying for agricultural use[9].

"Flame and Obstacle Detection in Robotic Mowers"*This paper discusses a flame-detecting robotic mower, enhancing safety in dry areas. It also employs ultrasonic sensors for obstacle detection and Arduino-based programming for autonomous operation. The study highlights improved safety protocols and autonomous navigation advancements.[10].*

III.CONCLUSION:

Automatic grass cutters offer an innovative and efficient solution for lawn care and small-scale agricultural applications. By integrating renewable energy sources like solar power, these devices contribute to sustainability while reducing energy costs and environmental impact. Advances in sensor technology, including ultrasonic and flame detection, enable autonomous navigation and improved safety, making them suitable for various terrains and conditions. Dual-mode operation, combining manual and autonomous functionalities, enhances user control and flexibility.

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