



## AUTONOMOUS ROBOT FOR GRASS CUTTER FOR LAWN MAINTENANCE

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### **ABSTRACT:**

The present technology commonly used for cutting the grass by using the manually handle device. The project aims to fabricate a grass cutting machine system controlled by android application using Bluetooth module feature which runs with the help of motor by using solar energy. In previous days, grass cutter machines are operated by fuel and electrical energy which are costly and requires high maintenance. The solar panel is used to charge the battery so that there is no need of charging it externally. The solar based energy source is easier to use, more advantageous compared to other energy and it is easy to work [1]. By the use of solar panels we can harness sunlight to generate electricity free of cost. The trapped solar energy is used to charge the battery for grass cutting operation. The movement of the machine is totally controlled by automatic mode or manual mode. The Bluetooth controller run this machine movement and direction through an android application. The controlling device of the whole system is microcontroller. Bluetooth module and DC motors are interfaced to the microcontroller. The data received from the android phone application by Bluetooth module is fed as input to the controller and the controller acts according on the DC motor of the solar grass cutter. In achieving the task, the controller is loaded with a program written using Embedded 'C' language.

**Keywords:***CREO, multi plate clutch, structural and thermal evaluation, static analysis.*

### **1. INTRODUCTION:**

Robotization is beneficial at many stages of human life. The attractiveness of any hotel, residence, park, meeting hall, etc. is enhanced by the finely shaped trimmed grass. As a

result, maintaining the status of any house or hotel requires consistent lawn trimming [1]. Manual grass cutting is feasible with humans, but it generally takes a lot of their time and



energy. Furthermore, manual grass mowing is inefficient and frequently results in non-uniform grass structure. To prevent all of these problems, it is preferable to utilise an automatic grass-cutting robot that can be controlled via a smartphone. [4]. and also nowadays the rate of the fuel is increased and using grass cutter which uses fuel will be costly. So to reduce the cost of fuel solar panels are used [2,3]. In this, we have described the latest features and technology used in grass cutters with help of IoT and Bluetooth. The Thing in IoT may be someone with a screen, for instance, protests that are given out an information science address and can aggregate and move information over a relationship without manual assistance [6]. This grass cutter has a unique function in that it can be operated from an Android phone and will automatically stop when an impediment is identified [5]. And the reading of the sensor is stored in the

cloud with help of a Wi-Fi module. We can even operate it using our mobile phone, which is a very ubiquitous device that everyone has in their pockets [10]. To control the movement of the machine in this device, we utilise a Bluetooth terminal app. A mechanism known as a servo motor is being offered for the up and down motion of grass cutter [9]. An ultrasonic sensor is utilised to identify the obstacle's location and signal the arm to react. Finally, we've come to talk about the energy consumption of this device. We utilised a solar panel and a battery with a 12V capacity [8]. The proposed sun-based grass cutters are harmless to the ecosystem; it keeps the climate perfect and solid. The battery will charge from the sun using a solar panel [3]. The non-skilled person also can handle it easily by using simple switches or by predetermined programming it can be easily handled and controlled with less period of time [5]. It is highly



efficient and accurate because it detects the obstacle and changes the directions or stops functioning as per instruction given. Therefore, the equipment can be protected from damage and reduce the risk to humans [11]. This knowledge can be used in the agricultural field in the future.

## 2. LITERATURE SURVEY

A Solar grass cutter is a machine that uses sliding blades to cut a lawn at an even length. Even more sophisticated devices are there in every field. Power consumption becomes essential for future. Solar grass cutter is a very useful device which is very simple in construction. It is used to maintain and upkeep lawns in gardens, schools, colleges etc. Rapid growth of various high-tech tools and equipment's makes our jobs done comfortable and sophisticated. The project aims at fabricating a grass cutting machine system which makes the grass cutter based motor running through solar energy. Power plays a

great role wherever man lives and works. The cutting mechanism is made of a flat blade rigidly fixed to the frame behind the spiral arrangement which is configured to contact at least one reel bar of the spiral blades during the rotation of the spiral mechanism .The cutting effectiveness was achieved with a total power of 934.3watts at a rotary speed of 1000rpm of shaft. For designing of Automatic Lawn Cutter various literature, papers were referred. The review of previous method used given below: In this lawn mower uses an solar based energy source, which is easier to use, more advantageous comparing to other energy source especially for gas based source of power .But the lawn cutter is not based on solar because of its cost and may create some complexity during working . In this hydrogen based lawn mower, the advantage of powering a lawn mower by hydrogen rather than by gasoline is



mainly ecological. It not used this for our lawn cutter because it is very old method and many overcome produced from this type lawn cutter. The self-powered design objective is to come up with a mower that is portable, durable, easy to operate and maintain. It also aims to design a self- powered mower of electrical source; a cordless electric lawn mower. The heart of the machine is a battery-powered dc electric motor. It is also useful method for our lawn mower. It is similar to the lawn cutter using display and keypad. The present technology commonly used for trimming the grass is by using the manually handle device. In this project the machine for trimming the grass were used.

### **3. PROPOSED METHODOLOGY:**

We consulted a variety of sources for the fabrication of an IoT-based solar lawn mower. Different ideas were evaluated before designing the grass cutter. From the survey, we got to know different challenges which are

faced by normal grass cutters in terms of accessing electricity also the normal solar grass cutter needs a lot of human effort based on these challenges we have developed the solar grass cutter using IoT. The Raspberry Pi controller is used to control the solar grass cutter, which is made up of an induction motor, a battery, blades, and an induction motor. And for charging purposes, we have used a solar panel that charges the battery whenever it gets discharged. The Dc motors are connected to blades for cutting purposes. This is done by the combined effect of the cutting sharp edges' mechanical activity and the robot's forward push. The system is powered by an electrical switch that connects the induction motor to the battery and completes the circuit. The Ultrasonic sensor is determining the course to prevent hitting any obstacles or causing harm to the machine. And with the help of the Bluetooth



terminal app, we can control the direction of motors. And the reading of the Ultrasonic sensor is stored on the think speak cloud. Figure (1), illustrate the operation of IoT based solar grass cutter on the input side of grass cutter the ultrasonic sensor are connected for obstacle sensing. The battery is connected to a solar panel for charging purposes whenever the battery will get discharged with the help of a solar panel it will get charge again. And the Bluetooth module is used to connect the raspberry pi to the android phone so machine can be controlled with the help of the android phone. And here as we can see at the output we have connected the LCD display so whenever the obstacle is detected how much distance the obstacle is there will be displayed on the LCD display. And the reading of the Ultrasonic sensor is stored on the think speak cloud with help of the Wi-Fi module. At the output, the DC motors are connected to the motor

driver. The table 1 shows the components which we have used for hardware and in figure 2 the working of model can be understand as in the flow chart we can see that first we will start the relay button to start the motor and then the initialization will be done to move the robot after that if the obstacle will detected then the motor will stop moving at its place. As shown in figure 1 the motor is connected to the power supply so that it can get 12v. Here we have used 2 motor drivers and 3 motors in which 1 is for cutter and another is for wheels. Here the Bluetooth model is used to connect to the phone so that we can control the robot by sending the command from the phone using the Bluetooth terminal app.

Now a day's energy plays a very important role in lot of people's life. Here the solar panel is used for charging the battery when it gets discharged. Here we can control the grass cutter with the help of Android



phone so that we can cut the grass in any shape we want and even we can cut the grass without much human efforts. For the simulation we have used the proteus software in it we have did the simulation in which we have shown when obstacle gets near to Ultrasonic sensors the distance between the obstacle and robot will be displayed on the LCD.



## 5. CONCLUSION:

With the help of Bluetooth module the man power will required less and the cost of the robot will also decrease. The unskilled person can also easily use this robot for grass cutting purpose. And we can also check the reading of Ultrasonic sensor on Thinkspeak. In the future, AV mechanisation and image processing might be added to fully automate the

system. In future we can cut the grass in different size by adjusting the blades.

## REFERENCES:

- [1] Ayesha Sultana, Shireen Fatima, HajaraMubeen, Reshma Begum, and Ahsan Jameel, "A Review on Smart IoT based Gesture Controlled," IEEE international Conference on Trends in Electronics and Informatics, pp. 440-444, June 2020.
- [2] M. Manimegalai, V. Mekala, N. Prabhuram, and D. Suganthan, "Automatic Solar Powered Grass Cutter Incorporated with Alphabet Printing and Pesticide Sprayer.," International Conference on Intelligent Computing and Communication for Smart World IEEE, pp. 268-271, December 2018.
- [3] M. Habib, K. Ahmed, N. Khan, M. Hasan, and O. Farrok, "PID controller based automatic solar powerdriven grass cutting machine," International Conference on Computer, Communication, Chemical, Materials and Electronic Engineering IEEE, pp.



268-271, July 2019. [4] A. Paala, M. Garcia, A. Supetran, and B. Fontamillas, "Android controlled lawn mower using bluetooth and WiFi connection.," IEEE 4th International Conference on Computer and Communication Systems , pp. 702-706, February 2019. [5] H. Zhou, Q. Zhou, S. Zheng, and B. Kong, "Research on path planning algorithm of intelligent mowing robot used in large airport lawn.," International conference on information system and artificial intelligence IEEE, pp. 375-379, June 2016. [6] O. Adeodu, A. Daniyan, S. Ebimoghan, and O. Akinola, "Development of an Embedded Obstacle Avoidance and Path Planning Autonomous Solar Grass Cutting Robot for Semi-structured Outdoor Environment.," IEEE 7th International Conference on Adaptive Science & Technology, pp. 1-11, August 2018. [7] Snehal Jagdale and Rajput Priti, "Android Controlled Solar based Grass Cutter,"

International Journal of Engineering Research & Technology, vol. 9, pp. 750-753, July 2020. [8] Sumit Gupta, Prakhar Upadhyay, Yogendra Sharma, Sachin Dwivedi, and Utkarsh Srivastava, "IOT Based Solar Grass Cutter," International Research Journal of Engineering and Technology, vol. 7, pp. 3639-3644, June 2020. [9] V. Kubendran, S. Fernandez, K. Vijayakumar, and K. Selvakumar, "A Fully Automated Lawn Mower Using Solar," Jour of Adv Research in Dynamical & Control Systems, vol. 10, pp. 977-983, July 2018. [10] Firas B. Ismail, A. Zukipli, and FuziFazreen, "Design and Development of Smart Solar Grass," International Journal of Engineering and Advanced Technology, vol. 9, pp. 4137-4144, December 2019. [11] Sachin Aralwad, Chinmay Hire, and Unmesh Kamble, "Solar Grass Cutter Using Bluetooth," Muktsabd Journal, vol. 9, pp. 661-667, June 2020.