of Science and Technology
ISSN: 2456-5660 Volume 7, Issue 01 (JAN-FEB 2022)
Journal
www.jst.org.in *DOI:https://doi.org/10.46243/jst.2022.v7.i01.pp129-135*

AUTOMATED SOLAR-POWERED GRASS TRIMMER

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ABSTRACT

Environmental issues, such as pollution and power shortages, are becoming more commonplace. We've looked at creating a gadget that can do its job without producing any of the problems mentioned above as a solution to these problems. That is why we have considered starting a grass-cutting initiative that utilises solar power as a source of sustainable energy. For locations where electricity is absent, a solar-powered lawn cutting equipment is being developed. As a result, we've chosen to design a solar-powered gadget. The battery is charged via a connection that links the solar panel to the battery. The belt drive must be linked between the motor and the shaft in order for the blade to rotate. This will accelerate the blade's spin, causing it to cut the grass. This gadget will aid in the development of a more environmentally friendly system. As far as cutting grass goes, manual equipment is the most prevalent method of doing it. Researchers are working to construct a conventional robot that can mow a lawn in this study. In order to reduce the robot's excessive power consumption, a battery and a solar panel will be mounted on the robot's top. The system will include some autonomous navigation and obstacle recognition.A MOTOR, AN ULTRASONIC SENSOR, AND A SOLAR PANEL BATTERY

INTRODUCTION

There is an increase in the occurrence of environmental concerns, such as pollution, power outages, and other difficulties, in recent years. For the purpose of overcoming these concerns, we have looked into the construction of a gadget that can fulfil its tasks without generating any of the issues described above. Consequently, we have looked into the possibility of initiating an agricultural project that depends on renewable energy sources, such as solar electricity, for its operation and maintenance. It is being developed a portable solar-powered lawn cutting system that may be used in remote regions when electricity is not accessible. Consequently, we have chosen to design a gadget that is fully powered by solar energy instead of conventional energy sources. It is possible to connect the solar panel and the battery together with the aid of an electrical cable. This means that a belt drive must be connected between the motor and the blade shaft in order for the blade shaft to circle. This will cause the blade to revolve at a rapid rate, resulting in the grass being cut as a consequence of the rapid rotation. This gadget will contribute to the development of a system that is more environmentally conscious.. The most often used kind of technology for cutting grass is a manually operated machine, which is now the most prevalent. Within the scope of this study, efforts are being conducted to produce a commonplace robot that is capable of mowing the grass in a yard area on a regular basis. A portion of the navigation and other obstacle detection tasks will be automated in the system, and the power source, which will consist of a battery and a solar panel, will be mounted on the robot's top in order to alleviate the issue of excessive power consumption.

Existing system

These days we are facing the problems like pollutions, power cut problem etc. In order to overcome these problems, we have thought about the device, which can be performing its functions without causing any of these problems. So we have thought of doing the project on cutting grass, this uses the renewable source of energy for its operation likesolar energy. This project aims at developing a portable solar operated grass cutting device, as there is power shortage. Sowe have decided to make a solar energy operated device. Solar panel is connected to the battery. Then by connectinginverter to battery DC current is converted to AC current. This will run the AC motor. This motor is connected to bladeshaft by the help of belt drive. This will rotate the blade in high speed, cut the grass. This device will help in building ofeco-friendly system. Current technology commonly used for cutting the grass is by the

manually handled device. In thispaper used novel technology. So in this paper we are trying to make a daily purpose robot which is able to cut the grassesin Lawn. The system will have some automation work for guidance and other obstacle detection and the power source thatis battery and a solar panel will be attached on the top of the robot because of this reduces the power problem.

1. BLOCK DIAGRAM:

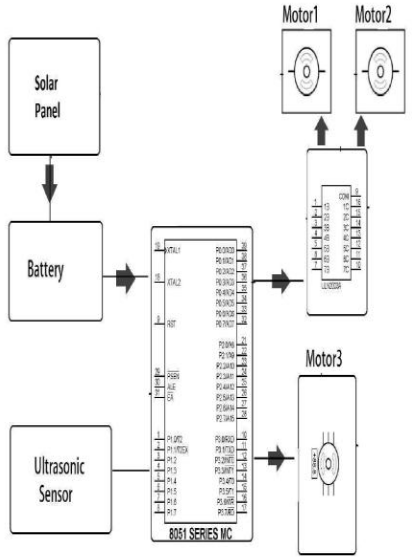


Fig 3.1: block diagram fully automated solar grass cutter

SOLAR PANEL: A solar panel, also known as a photovoltaic module, is an assemblage of photovoltaic cells that are installed on a support structure. Solar panels create direct current electricity by harnessing the energy of the sun as a source of energy.

BATTERY: A battery is a source of electric power that is made up of one or more electrochemical cells that are connected to the outside world and used to power electrical equipment.

Ultrasonic sensors are electronic devices that detect the distance between a target item and themselves by producing ultrasonic sound waves and converting the reflected sound into an electrical signal. They are often used to measure the distance between people and objects.

An electrical machine that transfers electrical energy into mechanical energy is referred to as a DC motor or a direct current motor. In a DC motor, the electrical energy input is in the form of direct current, which is then translated into mechanical rotation by the motor's gearbox.

PROPOSED SYSTEM :

The "Fully Automated Solar Grass Cutter" is shown in detail in the block diagram shown above. In accordance with the block diagram, there are a number of components that are all coupled to one another. It is the sun's rays that charge the solar panel, which subsequently causes it to generate power. The battery is in charge of storing the energy that has been generated. The microcontroller receives this electricity and is in charge of managing the whole device and ensuring that it runs automatically. It is an ultrasonic sensor that detects or feels the presence of a certain object. It is controlled by a microcontroller, which is located on the board. When it comes to cutting grass, the blade is used to do this.

2. PROBLEM STATEMENT:

Grass cutter machines are often seen in use in housing developments and bungalows for permanent residents. It is common to observe grass cutter machines being operated manually and in the conventional method in business places such as industrial regions. Fuel was used to power the grass cutter machine, just as it had been in the previous era. In recent years, the cost of gasoline, which is required to power the cutters, has also increased significantly. As a consequence, we wish to look into other energy sources such as solar energy. In addition to this, a modification to the blade will be implemented in order to make use of a new material that is not hazardous to the user. As a consequence, lawn mowers that are both user-friendly and ecologically benign are produced.

APPLICATIONS :

- For cricket ground.
- The football ground.
- All garden
- All Playground For colleges
- For small farms.
- for nurseries

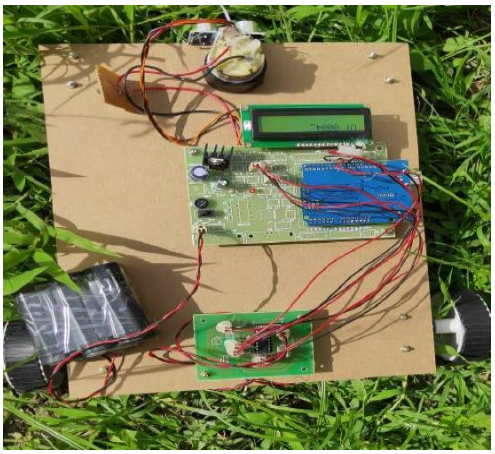
ADVANTAGES :

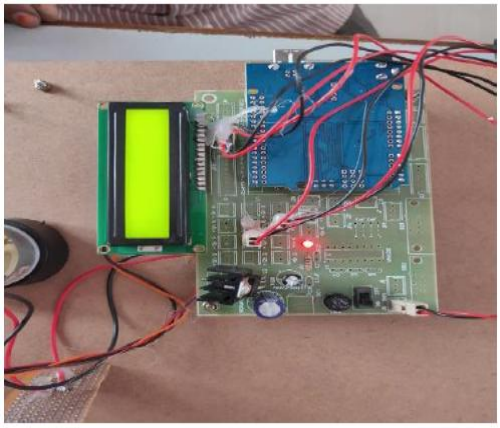
- Non skilled person can also operate.
- It is pollution free.
- No required any external supply.
- It is economical.
- Compact in size and portable.
- No any fuel cost.
- Easy to move from one place to another place.
- Freedom from long extension wires.

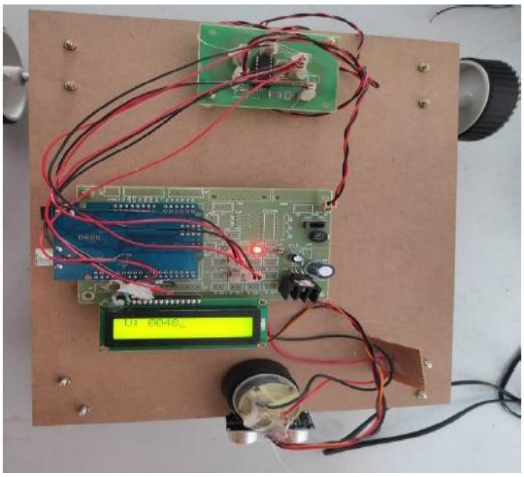
DISADVANTAGES :

- Difficult to operate in rainy seasons.
- Failure of blade can occur.
- Time required for removing the grass is higher than the conventional one.

Results:







EXCUTION STEPS:

• In this block design, three 4v batteries are utilised in place of a solar panel, which saves money on electricity costs.
• There will be three batteries with a voltage of 12 volts.
• So that they are all connected together, the batteries will be linked in a series I=I1+I2+I3 so that they are all connected together

• An ultrasonic sensor is utilised to detect the presence of the target.

• This system is completely self-contained and does not need human involvement.

It will be possible to identify any obstructions by employing an ultrasonic sensor, which will be utilised to recognise them.

When cutting the grass, a grass cutter motor is used, and this motor is totally powered by batteries, which are included in the package.

In addition, it will be capable of identifying the corner of a certain grass.

Aurdino motors are also used to cut glass, one of which is attached to a second extension motor that is powered by the battery and is utilised to do so.

The installation of fully automated solar lawn cutters in gardens, playgrounds, and other public spaces will take place.

WORKING:

For a solar-powered grass cutter to operate well, it must have solar-powered panels installed in a precise layout at a 45-degree angle in such a manner that it can gather solar radiation from the sun with high intensity with relative ease. In a process referred to as conversion, solar panels convert solar energy into electrical energy. This process has been addressed earlier. This electrical energy may now be stored in batteries with the assistance of a solar charger. Solar chargers are capable of performing a variety of tasks. In order to enhance the current taken from solar panels while batteries are being charged, their principal role is to raise the voltage of the solar panels. When the batteries have been entirely recharged, they separate the solar panels from the batteries and rejoin them to the panels when the batteries have been just halfway recharged. The motor and the batteries may be connected together with the aid of connection cords. In between these two, there is a two-motor driver provided. It is in charge of initiating and terminating the functioning of the electric motor. The power is transferred from the engine to the mechanism, which causes the blade to circle at a quick pace, resulting in the cutting of the grass as a consequence of the transmission of power.

3. CONCLUSION :

It has been finished successfully, and the results achieved have been good, in our project named Manufacturing of a solar-powered lawn cutter. It will be less difficult for those who will be responsible for the project's later adjustment if this is done in advance. This project is more ideal for the average person since it offers several benefits, including no fuel costs, no pollution, and no fuel residue, reduced wear and tear owing to the limited amount of moving components, and the ability to be powered entirely by solar energy. This will provide much greater physical activity for the individuals and can be managed effortlessly. In this technology, the batteries may be recharged while the solar-powered lawn cutter is in operation, which is a convenient feature. As a result, it is far more appropriate for other applications such as lawn cutting. Because there is a capability to charge these batteries in the daytime, the same thing may be done at night as well as during the day. The mechanism that we utilised, namely the scotch yoke mechanism, did not perform as expected in terms of efficiency. Utilizing a different mechanism may help to improve efficiency even more. The motor's speed has been reduced as a result of the usage of heavy materials; however, this material may be replaced with lighter materials. and the design of blades should be done in accordance with the varieties of grass that will be mowed. As a result of our work, we have successfully reached typical households since the grass may be cut with no expense and with minimal time commitment if done properly. Finally, this project may serve as an example for others who want to alter it in order to get a better outcome.

4. FUTURE SCOPE

The resources that were made available to us enabled us to complete our job in a timely and efficient manner. The outputs and modifications, on the other hand, fall short of the goals and expectations. In terms of efficiency, the

mechanisms that we used, such as the scotch yoke mechanism, did not function as well as we would have anticipated. By using a new mechanism, this efficiency may be improved, and the speed of the motor has been lowered as a result of the use of heavy materials, which can be replaced by utilising lighter materials. and the design of the blades should be done in line with the types of grass that will be mowed should be considered. It is without a doubt that the project that we have accomplished will assist average households since the grass can be cut at a reasonable cost and in a very short period of time. At the end of the day, our effort may serve as an example for others who are able to replicate it and achieve even better outcomes in their own backyards.

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