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Review On Solar Grass Cutter With Spray

Prof.Sunil Parge[1], Jayesh Dhadve[2], Sandesh Jadhav[3], Saurabh Jadhav[4], Amay Maske[5]

[1]Asst.Professor Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

[2]Student Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

[3]Student Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

[4]Student Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

[5]Student Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

ABSTRACT

The paper aims at designing and fabricating a solar grass cutter with water spraying system using RF Technology to reduce man power, pollution and usage of electricity in gardening. Both the grass cutting and the water spraying application can be executed in parallel. Power supply performs an amazing function anywhere people lives and works. The residing values and affluence of a country range at once with the growth with the usage of power. Worlds electricity requirement is growing at an alarming price because of commercial growth, improved and huge use of electrical gadgets. The high-quality alternative opportunity supply is from the sun energy. In this design the source energy is ambitious from the sun radiation by using PV panels and it is stored in 12V rechargeable DC battery. The proposed proto-vehicle performs two operations that are controlled using a switch. The first operation is grass cutting, the grass cutting blade is connected a DC Motor. The second operation is the spreading of water/pesticide, here we use a water pump connected to the spreading nozzle by the means of hoses.

Keywords: Electricity, Electrical gadgets, Spreading nozzle, Ecological, Solar panel , microcontroller, prototype

1.INTRODUCTION

Moving the heavy motored grass cutters is a troublesome, and no one receipts desire in it. The usage of conventional lawn mowers is hazardous and is not an easily accomplishable job. Also, the conventional lawn mowers generate noise contamination owing to the brash engine, and native air contamination due to the burning in the engine. A motor- powered engine needs intervallic care such as altering the engine oil. As the cost of the fuel is growing, it is not considered to be economical. Our paper aims at designing and fabricating a grass cutter and water sprinkler that exploits power generated from sun as an energy spring which is destined to discourse a number of problems that the typical interior combustion engine mowers do not have. An electrical grass cutter using a solar charging station is easy to use. This will remove the releases of an internal combustion mower that is very much accountable for ecological contamination and creates the green gas effect. So use energy from sun which is green and renewable. Hence the electricity is saved and manpower is reduced. The main parts of this proto-vehicle are 12V DC motor which it associated with sharp rotating blades, 12V rechargeable DC battery, solar panel to charge the battery, wiper motor, water tank connected to a rotary water pump and remote-control circuit. The operations performed are grass cutting and water/pesticide spraying. They are controlled by switched available near the handles of the frame made of square mild steel rods. The battery is connected to the pump& motor operated by on/off switch.

There are lots of progress work has been pending but there is still some labour power which requires lots of income allocation for a small work. So this is required that some exertion should have some other substitute so that the labour power surplus can be avoided. So in our project we are trying to make a daily purpose robot which is capable to cut the grasses in lawn. The project work will be done according to the appropriate application based production. The system will have some automation work for assistance and other obstacle recognition. The system will have a power source that is battery and a solar panel will be attached on the top of the robot. Moving the grass cutters with a standard motor powered grass cutters is a nuisance, and no one takes contentment in it. Cutting grass cannot be effortlessly accomplished by elderly, younger, grass cutter moving with engine create noise pollution due to the loud engine, and local air pollution due to the combustion in the engine. Also, a motor powered engine requires intermittent maintenance such as altering the engine oil. Even though electric solar grass is ecological friendly, they too can be an inconvenience. Along with motor powered grass cutter, electric grass cutters are also risky and cannot be easily used by all. Also, if the electric grass cutter is corded, moving could demonstrate to be challenging and unsafe. The trial product will also be charged from sun by using solar panels.

The design of solar powered agricultural equipment (e.g. grass cutter) will include direct current (D.C) motor, a rechargeable battery, solar panel, a stainless steel blade and control switch. The automatic grass cutting machine is going to perform the grass cutting operation by its own which means no manpower is mandatory. The purpose of this project is to design and build a remote controlled grass cutter. This will be favourable because man power is not essential in managing cutter on those hot summer days, where you will prefer not to be out in the sun. The remote will permit the user to control the speed and direction of the grass cutter. In this paper will learn more on how we will go about completing this project and what various parts will be used that replaced the physical power essential in moving the grass cutter.

2.LITERATURE REVIEW

Ashish Kumar Chaudhari et. al. [1] In this paper they have prepared manually handle device which is capable to cut the grass. This device consists of linear blades and it does not affected by climatic conditions. They have used following components for preparing grass cutter.

If any obstacle comes in front of grass cutter then it sense by IR sensor and gives signal to the microcontroller to change the direction or stop the grass cutter until the obstacle is removed. The main objective of this paper is to move the grass cutter is different directions to prepare various designs as per requirements. By using link mechanism the height of the cut can be adjusted. The unskilled labour can easily operate this device.

Vicky Jain et. al. [2] They have prepared wireless grass cutter. There are two main components such as transmitter and receiver. Transmitter continuously transmits the rays if any obstacle come in front of grass cutter then the rays are reflected back towards the receiver. The receiver receive the signals in the serial form encoder but microcontroller required parallel data for communication so receiver sends data to decoder to convert data in the parallel form and then it passed to microcontroller. They have used solar panel so it is not required to charge battery externally and battery is continuously charged at constant voltage when grass cutter is in working. The battery is charged in day time by using solar panel and it is stored so we can use grass cutter at night time also. Because of two DC motor both forward and backward motion of grass cutter can simultaneously possible.

Ashish Kumar Chaudhari et. al. [3] In this paper author explained that solar plate which is placed above the grass cutter generates solar energy and use this energy for working the grass cutter. Also, using driver circuit forcontrolling speed of motor as per the requirement. Solar panels, batteries, DC motor, solar charger, circuitry and blades these components are used for preparing grass cutter. For preventing battery from overcharging and over discharging regulator is placed into the system and it should be placed in series. They have provided LCD display unit which displays voltage generated during solar rays trapping. Due to seasonal conditions if battery is not charged they can provide the power bank to charge the battery instantly.

Pankaj Malviya et. al. [4] Author prepared manually handle device. The battery can be charged by using solar panel as well as external power supply and DC motor which is controllable is used for changing the direction of grass cutter as per need are used. The most modern regulator is used for preventing overcharging and discharging of battery which saves span of battery. Due to industrialisation more electricity is required for various industrial applications and electrical gadgets so solar energy is best alternative for electricity. Solar panel, battery, DC motor, solar charger these components are used for fabrication of grass cutter. They have used less number of moving components so there is less maintenance. This grass cutter will give much more physical exercise to operator and it will easily handle.

Praful P. Ulhe et. al. [5] In this paper they have prepared manually operated grass cutter with spiral roller blades due to spiral blades increases the efficiency of cutting. For adjusting the height reel cutter is component placed on grass cutter. This grass cutter used to cut the grass uniformly and also it can cut the different types grasses. The battery can be charged during working conditions and it also having AC charging. For collection of cutting grass cutting box is placed over grass cutter so the cut grass put outside the lawn. It is having light in weight and compact in design. T.

Karthick et. al. [6] In this paper author fabricated grass cutting machine with rotary blades by using solar energy. The solar energy is trapped in the photovoltaic cell to generate electricity. The cells may be grouped in the form of panels or arrays. Solar panel is placed such that to absorb high intensity from sun and it will incline at 450. The main function of solar charger is increased current during batteries are charging and also disconnect when they are fully charged. Circuit's breakers are used to start or stop the motor. By considering ground clearance they can adjust the height of grass.

Tanimola et. al. [7] Author developed solar powered lawn mower. They found various results which are listed below, at 450. The main function of solar charger is increased current during batteries are charging and also disconnect when they are fully charged. Circuit's breakers are used to start or stop the motor. By considering ground clearance they can adjust the height of grass.

Tanimola et. al. [8] Author developed solar powered lawn mower. They found various results which are listed below, operated. The materials commonly used GI sheet, motor, wheel, Al sheet, switch, wire, square pipe and insulating material. The components used are comparator, rechargeable battery, relay, temperature sensor, DC motor. The voltage generated by using solar panel displayed on LCD display unit.

Dipin.A et.al [9] They prepared solar powered vision based robotic lawn mower which operated manually with less efforts. The predetermined program feed into the system and the robot moves as per predetermine pattern with the help of MATLAB programming as well as camera installed over the robot structure. Robots which is produced for reducing the human efforts also detects human and objects which is come in front of robot. Therefore it protects the equipment form damage and also reducing risk on human. The robot cut the grass in different direction for making different design patterns as specified by human.

Sachin Prabha et.al [10] The writer fabricate solar grass cutter machine for reducing human work and also consume non renewable sources of energy on the earth surface. By using solar panel the energy is acquire from sun and store it into batteries and uses this energy as per the requirement. All this functions are proceeding according to prescribed time by proper monitoring. A specific mechanism provide for protection of batteries from extra charging which increases life span of batteries. It can also be used for small scale for gardening.

3.OBJECTIVES OF PROJECT WORK :

For the manufacturing of a solar grass cutter we referred various literature, papers etc. The review of previous method use d 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 our lawn cutter is based on sola r because this energy is a renewable energy source and it is easy to work. So we made solar powered lawnmower.

4.METHODOLOGY:

The methodology for this project is similar to the prototype analysis process. In this project we are fabricating a prototype of the solar powered grass cutter. The methodologies of these attachments are explained in few sub- headings.

Methodology can properly refer to the theoretical analysis of the methods appropriate to a field of study or to the body of methods and principles particular to a branch of knowledge. In this chapter, it talks about the methods use to gather information in order to finish the research. It was involve the process flow of every step in archive the objective of this project. There are many methods use in this project such as internet references, interviewing lecturers and technicians and the most important is group discussion.

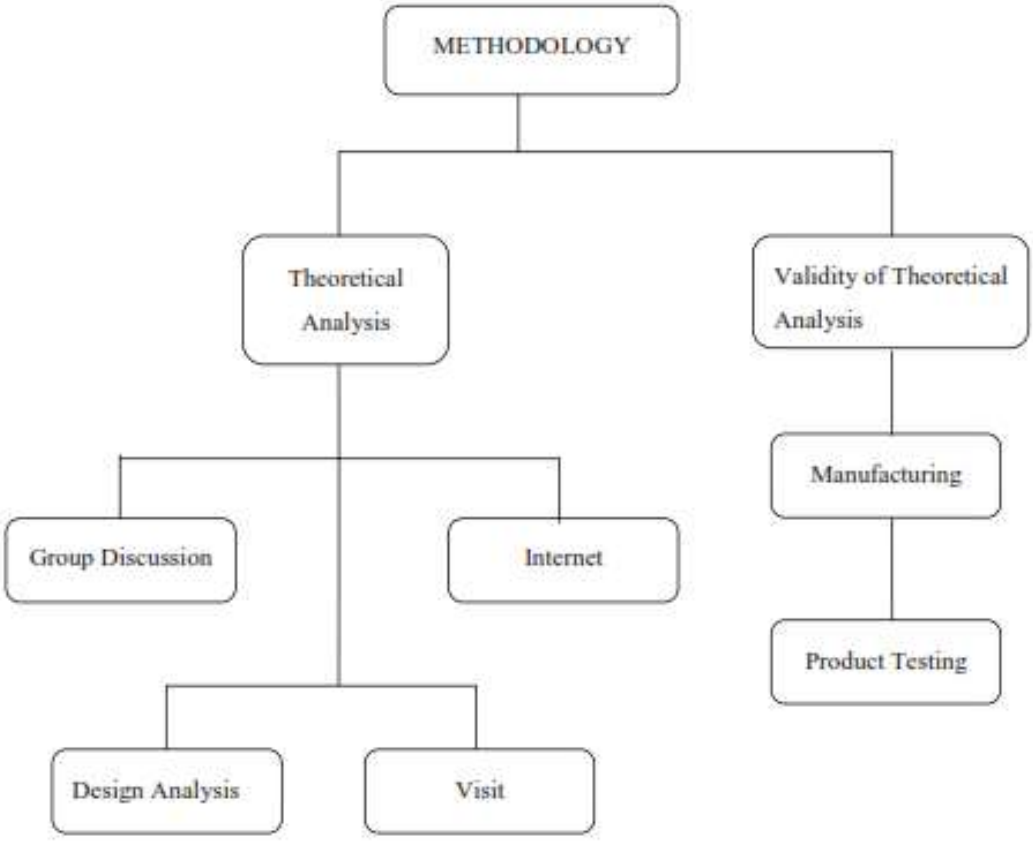


Diagram : 3.1 Methodology

METHODOLOGY OF WORKING PROCESS

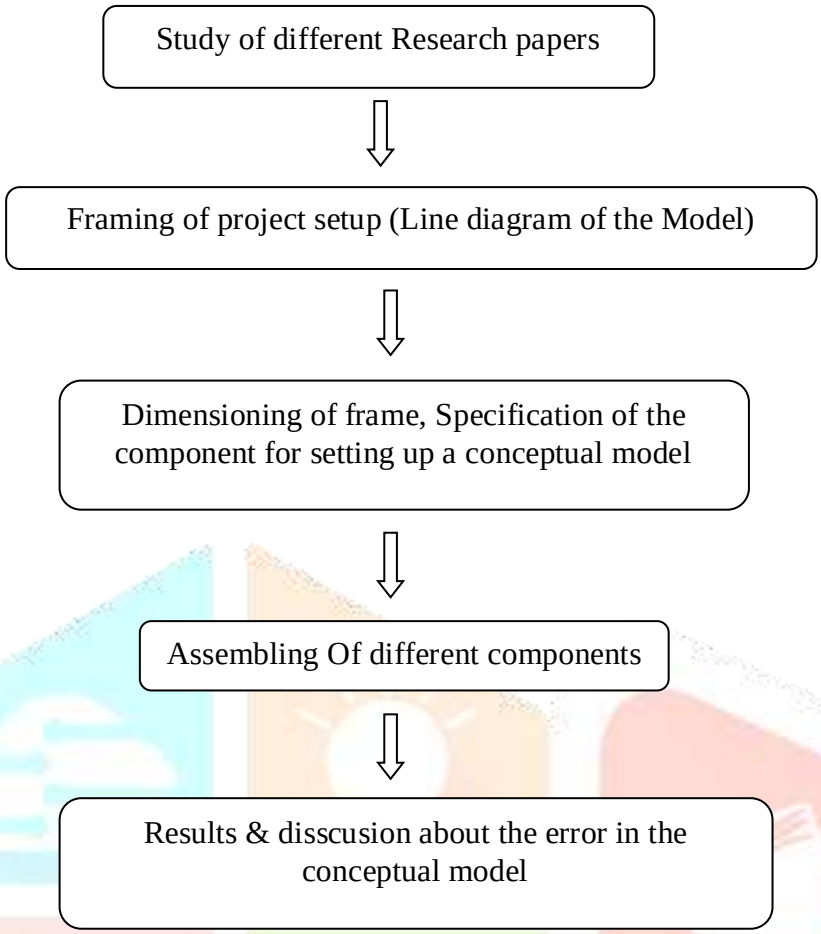


Fig. 3.2 Flow Chart For Working Process

COMPONENT OF ATTACHMENT:

The main components of the solar powered grass cutter are,

Solar panels

Photovoltaic solar panels absorb sunlight as a source of energy to generate electricity. A photovoltaic (PV) module is a packaged, connected assembly of typically 6x10 photovoltaic solar cells. Photovoltaic modules

constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications.

The most common application of solar energy collection outside agriculture is solar water heating systems.

LEAD–ACID BATTERY

The **lead–acid battery** was invented in 1859 by French physicist Gaston Planté and is the oldest type of rechargeable battery. Despite having a very low energy-to-weight ratio and a low energy-to-volume ratio, its ability to supply high surge currents means that the cells have a relatively large power-to-weight ratio. These features, along with their low cost, make them attractive for use in motor vehicles to provide the high current required by automobile starter motors.

DC MOTOR

A **DC motor** is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types

DC motors were the first form of motor widely used, as they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight brushed motor used for portable power tools and appliances. HIGH

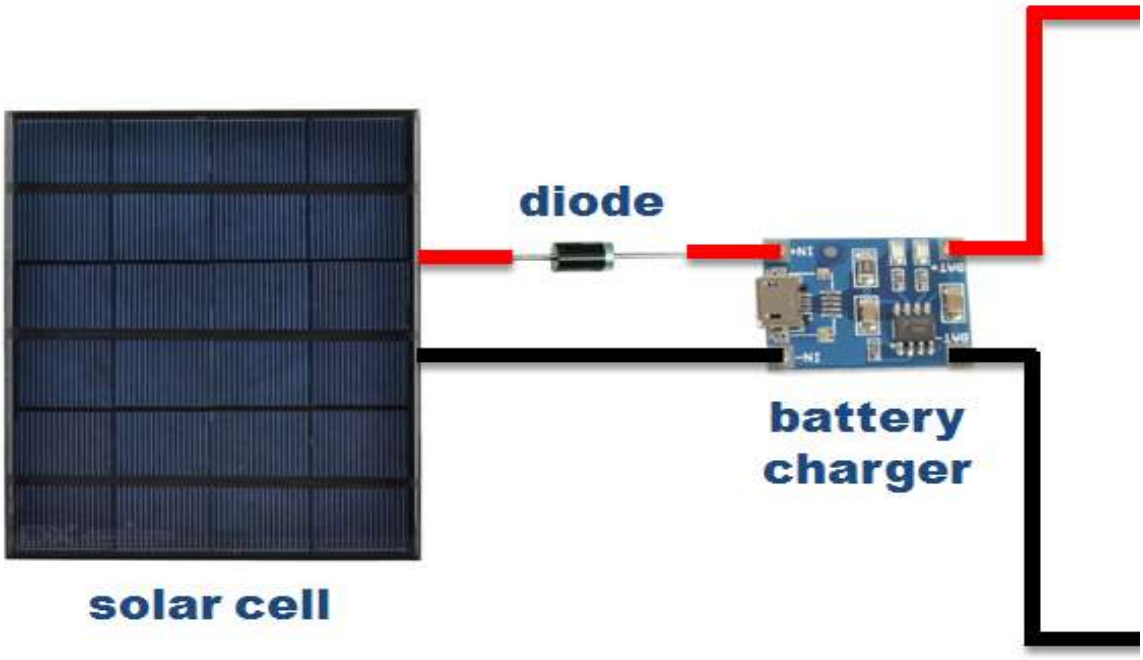
Fig.3.3 SPEED DC MOTOR 12 VOLT 8000 RPM FOR CUTTING GRASS

SOLAR CHARGER

A **solar charger** is a charger that employs solar energy to supply electricity to devices or batteries. They are generally portable.

Solar chargers can charge lead acid or Ni-Cd battery banks up to 48 V and hundreds of ampere-hours (up to 4000 Ah) capacity. Such type of solar charger setups generally use an intelligent charge controller. A series of solar cells are installed in a stationary location (ie: rooftops of homes, base-station locations on the ground etc.) and can be connected to a battery bank to store energy for off-peak usage. They can also be used in addition to mains-supply chargers for energy saving during the daytime.

CHARGER UNIT TO SAVE SOLAR ENERGY TO BATTERY SOURCE :



MECHANISM USED

For cutting grass rotary unit will be utilized

Blades

SPST ROCKER SWITCH

It is an SPST Rocker Switch. Commonly it is used in small appliances, as AC and DC power ON-OFF switches, computers, and peripherals, medical instrumentation.

1. Switch Type: SPST
2. Contact resistance: <50mΩ
3. Insulation resistance: >100MΩ
4. Dielectric resistance: >1500VAC / 1 min

Nozzle

The nozzle is a critical part of any sprayer. Nozzles perform three functions:

- Regulate flow.
- Atomize the mixture into droplets.
- Disperse the spray in a desirable pattern.

FEATURES OF PROJECT :

i. No operating cost.
ii. For operating trained operator not required.
iii. No maintenance cost.
iv. Simple working.
v. High load carrying capacity.
vi. Portable unit .

ADVANTAGES

i. Design for easy to operate, servicing and maintenance where required.
ii. Most Eco-friendly & clean source of power.
iii. No pollution and no recurring fuel costs, highly, reliable and consistent power supply.
iv. Long life span for SPV modules & Modular design.
v. Very few moving parts negligible maintenance required.
vi. Increases public safety and aids in providing a safe working environment in areas where mains power is risky.
vii. Low Height required.

APPLICATIONS

i. Ideal for cell phone recipient station.
ii. Farm house, guesthouse, Hospital, Hotels, Laboratories and R&D centers.
iii. Remote and Rural village Electrification.
iv. Street lighting.
v. Transmission and communication Tower and many more application.
vi. High output makes ideal for virtually any remote battery charging application.

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.

CONCLUSION

i. It consumes non-renewable sources of energy so total energy received from sun far exceeds our energy demand. It meant to be an alternate green option to the popular and environment hazardous gas powered lawn mower and reduces human effort.

ii. Non skilled person also handle it easily. By using simple switches or by predetermine programming it can be easily handle and control within less time span.

iii. It is highly efficient and accurate because it detects the obstacle and changes the direction or stop functioning as per the instruction given. Therefore equipment should be protected from damage and reduces risk on human.

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