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SOLAR BASED GRASS CUTTER: A REVIEW

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ABSTRACT

From time immemorial, the sun has been the major source of energy for life on earth. The solar energy was being used directly for purposes like drying clothes, curing agricultural produce, preserving food articles, etc. Even today, the energy we originate from fuel-wood, petroleum, paraffin, hydroelectricity and even our food originates obliquely from sun. Solar energy is almost unbounded. The total energy we obtain from the sun far exceeds our energy demands. Ever since the industrial revolutions human have been dependent on fuels, electricity and wind energy. For human enlargement in many countries there is study and trials are going on the Solar energy and the wind energy, So we make our new concept solar powered grass cutting machine in these concept we cut grass s on the agricultural products or on small plants in lawns and gardens. Remote controlled grass cutter can be described as the application of Radio frequency to power a machine on which electric motor rotates which in turn rotates a blade which does the mowing of a grass.

Keywords- Blade, Grass, Grass cutting machine, Motor, Solar energy

I. INTRODUCTION

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.

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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.

II. 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.

Table No. 1 Components of grass cutter.

Sr. No.	Item	Quantity	Remark
1.	DC Motor	2	Rotating the wheel
2.	DC Motor	1	Rotating the blade
3.	Wheel	4	Moving the robot
4.	Battery	1	Power supply for motors
5.	Solar panel	1	Power supply for batteries
6.	IR sensor	1	Obstacle detection
7.	Collapsible blade	3	High carbon steel resist wear

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 for

controlling 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 45^0. 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,

Table No. 2 Average height of grass before and after moving of each sample plot

Sample plot	Average height of grass before moving (mm)	Average height of grass after moving (mm)	Expected height of grass after moving (mm)
Elephant grass	224	90	100
Stubborn grass	234	92	100
Spare grass	111	70	80
Carpet grass	70.5	56.5	50

The average height of grasses after moving was lesser than the expected after the machine have been adjusted to a height for four species of grasses. Less time required for cutting the grass. The efficiency is also increases.

Ms. Lanka Priyanka et. al. [8] In this paper they have fabricated solar powered grass cutting machine with tempered blades are attached to this grass cutter. This grass cutter is manually operated as well as automatic

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.

III. CONCLUSION

- 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.
- 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.
- 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.

IV. 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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