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SOLAR GRASS CUTTER

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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 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

1. INTRODUCTION

Nowadays, pollution is the major issue in the universe. In case gas-powered lawn mowers due to the emission of gases it is responsible for pollution. Also, the cost of fuel is increasing hence it is not efficient. Traditionally, lawn mowers are often clunky pieces of machinery that involve a lot of strength and energy to use. These present and high-tech grass cutters, however, have been creatively designed to make the whole landscaping process much simpler and easier for the user. From robotic lawn mowers that can incredibly cut the grass for you to those that are cleverly powered by solar energy, these convenient and easy-to-use grass-cutting devices make straightening up your lawn more pleasing. The grass-cutters use cordless electric mowers, trimmers, and blowers powered by clean renewable energy generated by solar panels mounted on

our trucks and trailers. We also use reel push mowers for smaller hard to access areas like pathways and parks. There's no oil, and no pollution. Just clean air, less noise, and green grass [1].

The other objective is that the automatic lawn cutter has to differentiate between grass and concrete while monitoring its surroundings continuously. We wanted an ultrasonic sensor to sense if the lawn cutter was heading into an object. Safety is the main concern while designing the lawn cutter. As it has blades we wanted our lawn cutter not to be in operating mode if it was being held in the air by the user. Knowing that the user would be randomly holding the lawn cutter we needed a sensor to detect orientation. The accelerometer was hence used in lawn cutter so that it will not operate when user holds it. An automatic lawn cutter will relieve the consumer from mowing their own lawns and will reduce both environmental and noise pollution.

2. PROBLEM STATEMENT

In the time where technology is merging with environmental awareness, consumers are looking for ways to contribute to the relief of their own carbon footprints. Pollution is manmade and can be seen in our own daily lives, more specifically in our own homes. Gas powered lawnmower is in 90% of u.s. Home and they create 5% of the total

U.s. Pollution. Green technology initiatives are being supported by both the government and cooperates business. Our new design for an old and outdated habit will help both the consumer and the environment [2].

In this paper, the solar-powered automatic grass cutter will relieve the consumer from mowing their own lawns and will reduce both environmental and noise pollution. This design is meant to be an alternate green option to the popular and environmentally hazardous gas-powered lawn mower. Ultimately, the consumer will be doing more for the environment while doing less work in their daily lives.

3. OBJECTIVE

The project aims at fabricating a grass cutting machine system that makes grass cutter motor running through the solar energy. The solar powered grass cutting machine is a robotic vehicle that is powered by solar energy which controlled by remote.

In this system, we use the battery to power the vehicle movement motor and grass cutter motor. The solar panel is used to charge the battery along with battery charger so that there is no need of charging it externally.

4. LITERATURE REVIEW

Ashish Kumar Chaudhari, 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 affect by climatic conditions. They have used following components for preparing grass cutter.

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 [3].

They have prepared wireless grass cutter. There are two main components such as transmitter and receiver. Transmitter continuously transmits the rays if any obstacle comes in front of grass cutter then the rays are reflected back towards the receiver.

The receiver receives the signals in the serial form encoder but microcontroller required parallel data for communication so receiver sends data to the decoder to convert data in the parallel form and then it passed to the microcontroller. They have used solar panel so it is not required to charge battery externally and a battery is continuously charged at the constant voltage when grass cutter is in working. The battery is charged in daytime by

using the 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 grasscutter can simultaneously possible[4,5].

Ashish Kumar Chaudhari , 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 925 | Page controlling the speed of the 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 the battery from overcharging and the 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 the battery is not charged they can provide the power bank to charge the battery instantly. Pankaj Malviya, 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 the battery which saves span of the battery. Due to industrialization, more electricity is required for various industrial applications and electrical gadgets so solar energy is the 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 the operator and it will easily handle. Praful P. Ulhe, In this paper they have prepared manually operated grass cutter with spiral roller blades due to spiral blades increases the efficiency of cutting. Foradjusting 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 the collection of cutting grass cutting box is placed over grass cutter so the cut grass put on the lawn. It is having light in weight and compact in design. T. Karthick, 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°. 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, Author developed solar powered lawn mower. They found various results which are listed below,

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, 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 , 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 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.

5. COMPONENTS USED:

- | | | |
|-------------|---|-------------------------|
| 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. Collapsible blade | 3 | High carbon steel resist wear |

6. 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. The non-skilled person also handles it easily. By using simple switches or by predetermine programming it can be easily handled and control within less time span.

We have made it automated by providing sensors. Therefore, it is highly efficient and accurate. Therefore, equipment should be protected from damage and reduces risk on a human.

7. FINAL PRODUCT

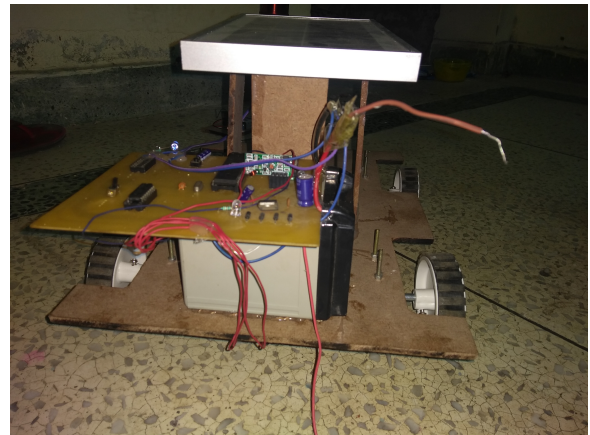


Fig. Front view of product

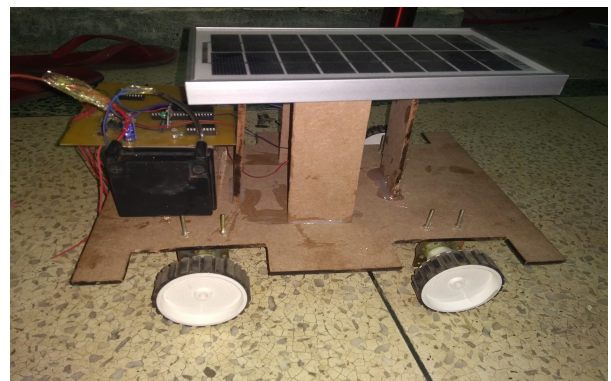


Fig. side view of product

8. APPLICATIONS

- It can be used in gardens for cutting the grass evenly.
- Also, it can be used in College Campus.
- It is useful in Lawns.
- It can be efficiently used in Agriculture areas.
- It can be used for cutting the grass of particular area of play grounds. e.g:-cricket, football playgrounds etc.
- Military applications

REFERENCES

- [1]. P.Amrutesh et al. Int. Journal of Engineering Research and Applications www.ijera.com, ISSN : 2248-9622, Vol. 4, Issue 9(Version 3), September 2014, pp.10-21
- [2]. The solar entrepreneur's handbook, Wise Publication
- [3]. Hollis, Scott. "Cordless electric lawn mowers: these battery-powered machines are clean, quiet and easy to maintain." Mother Earth News 209 (April–May 2005): 67(4). General Reference Center Gold. Gale. Fairfax County Public Library. 7 Apr. 2009.