



BLUETOOTH CONTROL GRASS CUTTER USING SOLAR POWER

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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.

Index Terms - Arduino, Solar panel, Battery, DC motor, Bluetooth module, Relay.

I. INTRODUCTION:

In this solar based grass cutter, the advantage of powering a grass cutter by solar rather than by gasoline is mainly ecological. The advancements are mostly designed to reduce the manual work and save power by utilizing the solar power to generate the electricity. This project is designed to reduce the labour power required in grass cutting at residences, agricultural areas etc. Here the solar energy generated from solar panel is stored in the battery and used to run DC motor in the system. The DC motor is attached with blade to trim the grasses.

II. 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.

III. BLOCK DIAGRAM AND DESCRIPTION:

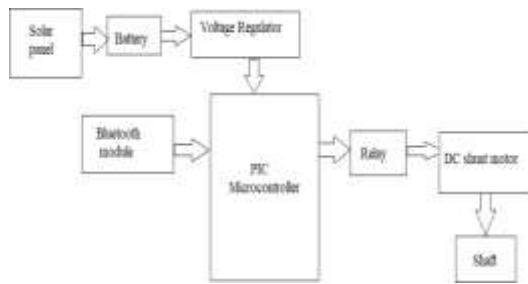


Fig. 1 Block diagram of the system

A. Motor

In any motor, operation is predicated on simple electromagnetism. A current-carrying conductor generates a magnetic flux; when this is often then placed in an external magnetic field, it'll experience a force proportional to the present within the conductor, and to the strength of the external magnetic flux. As you're cognizant of from twiddling with magnets as a child, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is meant to harness the magnetic interaction between a current-carrying conductor and an external magnetic flux to get rotational motion. The speed of motor used for blades is greater than the speed of motor used for moving the cutter.

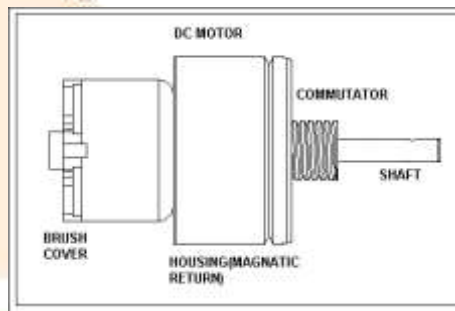


Fig. 2 DC Motor

Let's start by observing a simple 2-pole DC motor (here red represents a magnet or winding with a "North" polarization, while green represents a magnet or winding with a "South" polarization).

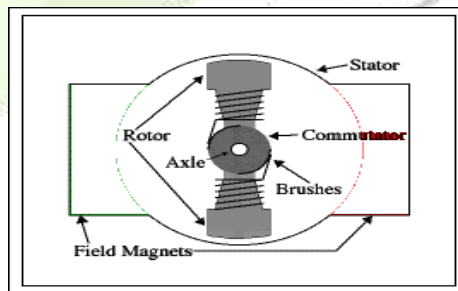


Fig.3 Pole DC electric motor

Every DC motor has six basic parts -- axle, rotor (armature), stator, commutator, field magnet(s), and brushes. In commonest DC motors, the external magnetic flux is produced by high-strength permanent magnets. The stator is that the stationary a part of the motor -- this includes the motor casing, also as two or more static magnet pole pieces. The rotor (together with the axle and attached commutator) rotate with reference to the stator. The rotor consists of windings (generally on a core), the windings being electrically connected to the commutator. The above diagram shows a standard motor layout -- with the rotor inside the stator (field) magnets

B. Bluetooth Module

It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard and many more consumer applications. It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. It is IEEE 802.15.1 standardized protocol, through which one can build wireless Personal Area Network (PAN). It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over air. It uses serial communication to communicate with devices. It communicates with microcontroller using serial port (USART).

C. Pic Microcontroller

The microcontroller that has been used for this project is from PIC series. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complementary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques PIC (16F877) various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in pic16F877 is flash technology, so that data is retained even when the power is switched off. Easy Programming and Erasing are other features of PIC 16F877.

D. Solar Panel

A solar panel is a device that collects and converts solar power into electricity or heat. It referred to as Photovoltaic panels, wont to generate electricity directly from sunlight Solar thermal energy collection systems, wont to generate electricity through a system of mirrors and fluid-filled tubes solar thermal collector, wont to generate heat solar predicament panel, wont to heat water. It is energy portal. A solar energy technology uses solar cells or solar photovoltaic arrays to convert light from the sun directly into electricity. Photovoltaic is during which light is converted into electric power. It is best referred to as a way for generating solar energy by using solar cells packaged in photovoltaic modules, often electrically connected in multiples as solar photovoltaic arrays to convert energy from the sun into electricity. The photovoltaic solar array is photons from sunlight knock electrons into a better state of energy, creating electricity..

Solar cells produce DC electricity from light, which may be wont to power equipment or to recharge a battery. A less common sort of the technologies is thermo photovoltaic, during which the thermal radiation from some hot body aside from the sun is employed. Photovoltaic devices are also used to produce electricity in optical wireless power transmission.

IV. HARDWARE SETUP:



V. WORKING PRINCIPLE:

Bluetooth control grass cutter consists of a motor, gear arrangement of a cutting tool. For this system the power get from the solar panel with respective battery. By using Bluetooth module, forward and reverse direction can be controlled. Forward and reverse program already prewritten in the microcontroller. From the PIC controller it is fed from the relay if any fault occurring in the electronic switches it will rectify by using a relay operation in it. Finally the dc shunt motor is connected to the cutting tool and it starts working.

VI. CONCLUSION:

In this proposed scheme made with pre planning, it is a economical method compare to the exiting method. It provides flexibility to the user. The comparative gain that can be accomplished is the utilization of motor in control unit. It is help full to many agricultural areas.

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