Smart Solar grass cutter

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Abstract

sun strength is the heat and light radiations obtained from the sun. it is one of the maximum considerable kinds of non-traditional, renewable power supply located on earth. it's far simply to be had, freed from price and is pollution unfastened. solar power can be harnessed to be modified into power and electricity via the usage of gadgets like solar panels which includes photovoltaic cells. Photovoltaic cellular is an electrical tool which converts sun's light into energy by using the belongings of photoelectric impact. by using using solar panels we will harness sunlight to generate energy freed from fee. in this assignment we've got used sun power within the manner of grass cutting of lawns, fields etc. The lawn mower is dual managed first by means of the laptop and different by way of the Bluetooth module. The pc controlling employs the real time monitoring device by means of the Lab View software program. Lab View is used for the stay coverage of the lawn / fields at the side of the values of voltages advanced inside the photovoltaic cellular in the course of the direction of the day. This actual time monitoring device could help to efficiently make use of the sun power developed inside the machine. The sun lawn mower when Bluetooth controlled may be operated from everywhere in the Bluetooth signal variety by using the cellular cellphone of the proprietor..

Keywords : solar panel,grass cutter, microcontroller, battery, solar charger.

I. INTRODUCTION

The technological improvements are commonly designed to reduce to reduce the manual work and shop time and labour energy. The conventional grass reducing, lawn cleansing equipments are manually treated. This project is designed to reduce the labour energy required in grass reducing at residences, corporates ,agricultural fields etc. The challenge is evolved to automatically function with none human need saving labour power and time. The garden mower is powered via the sun strength. sun power is one of the most plentiful forms of energy present on the earth whose green usage can reduce the weight of the fossil fuels. sun power is pollutants loose as a consequence it has no negative impact at the solar system.

Photovoltaic cells or sun cells are used to convert sun's heat and mild into strength. solar cells work on the precept of photoelectric effect. The photovoltaic cells are manufactured from semiconductor substances like Silicion. those semiconductor substances emit electrons when hit through the solar mild including protons.those loose electrons while captured result into electricity.

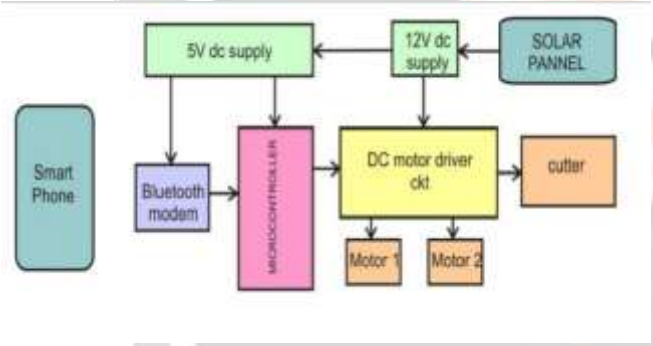
here the solar strength is stored in the batteries and on the same time used to force the controlling unit used this is arduino. The arduino is interfaced with the driving force motors for the cutting operation. Arduino is also interfaced with the ultrasonic sensor, the Bluetooth module and the personal computer. The output of the arduino is analysed at the computer and labview is used for the actual time monitoring of the photovoltaic cells and the area of the lawn blanketed
and the direction followed

II. Motivation

automated lawn mowers had been made to be had to the general public for over 30 years(Georges 1999, p.195); its significant or public use then again has been restrained specifically because of the contemporary fees of such devices. existing generation promote at round ↔899 ormore (lawn Mower reviews, 2011) and thinking about the reality that the guide variations of these devices, the usual garden mowers, sell at round ↔86 (lawn Mower opinions, 2011) despite the fact that the fee of labour would want to be introduced to that of the system, the latter continues to be a cutting-edge viable and affordable alternative for maximum purchasers. there are numerous actual-international blessings of having a gadget that autonomously cuts grass, those include: resource aged customers or those with disabilities who are unable to fulfil this task themselves for customers with a hectic time table and seldom find time to mow,etc.it's miles a device which could in shape into just about each person's way of life, therefore having a tool that costs much less, while accomplishing the identical task as the better stop fashions is a remarkable gain a good way to compete with the modern market wherein the quit patron will benefit from.

III. Block Diagram Smart Solar Current

on this proposed device we have used the atmega328 AVR microcontroller, four DC motor and motive force circuits. in this mission the gadget is been totally operated by sun electricity. the primary purpose of solar based totally grass cutter is to reduce the grass wherein farmer take an excessive amount of hard operating so we can reduce all that. In above block diagram there's one ultrasonic sensor which we've got used for impediment sensing while impediment is detected the robotic is forestall and vice versa.
Microcontroller continuously test the output of ultrasonic sensor and offers sign to the motor motive force circuit which drives the automobiles.



A. Solar panel

Photovoltaic modules use light -weight energy (photons) from the sun to come up with power through the electrical phenomenon result. most of the people of modules use wafer -based whole crystalline atomic number 14 cells or thin-film cells. The structural (load wearing) member of a module will each be the highest layer or the rear layer. Cells ought to even be blanketed from mechanical injury and wet. most modules ar inflexible, however semi -flexible ones based totally on thin-movie cells are also to be had. Module electrical connections are made in collection to attain a favored output voltage or in parallel to offer a favored contemporary functionality.

B. Atmega 328

The Atmel 8- bit AVR RISC-based microcontroller combines 32 KB ISP flash memory with read-while-write capabilities, 1 KB EEPROM, 2 KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2- wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal

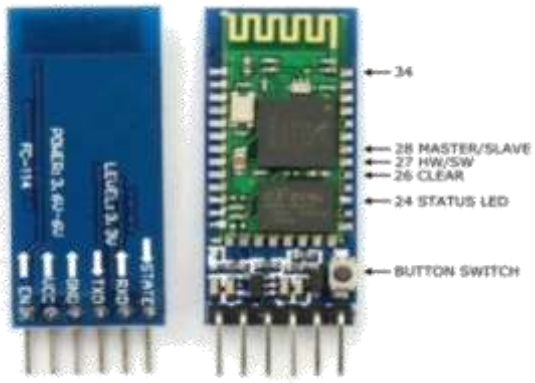
oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz.

C. Ultrasonic sensor

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound. In our project we used ultrasonic sensor to detect the obstacle.

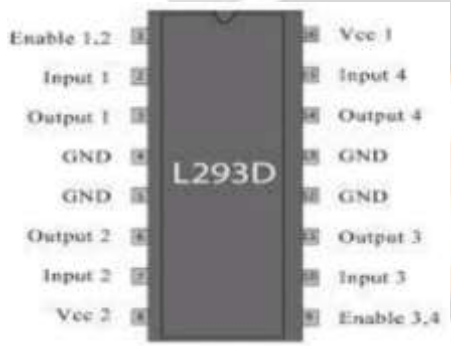
D. Bluetooth module

HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. HC-05 has red LED which indicates connection status, whether the Bluetooth is connected or not. Before connecting to HC-05 module this red LED blinks continuously in a periodic manner. When it gets connected to any other Bluetooth device,its blinking slows down to two seconds. This module works on 3.3V.

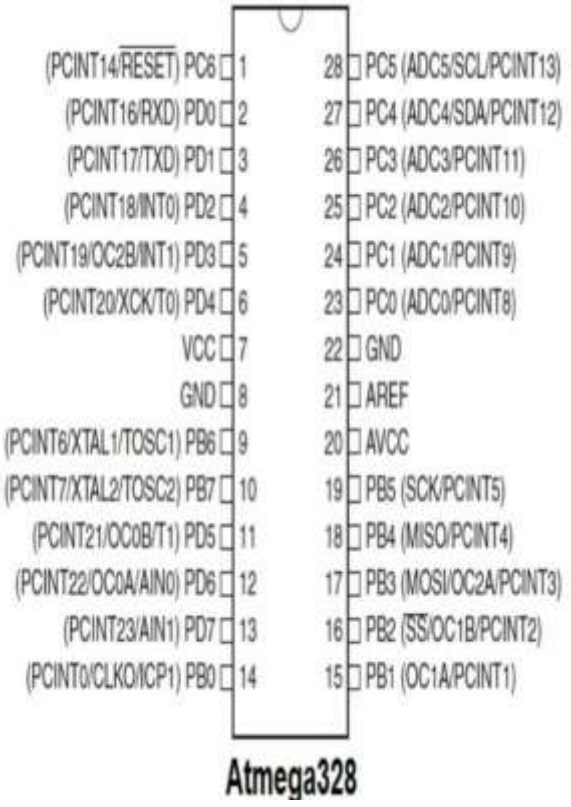


E. Motor Driver L293D

The L293D is a popular 16-Pin Motor Driver IC. As the name suggests it is mainly used to drive motors. The L293D IC receives signals from the microprocessor and transmits the relative signal to the motors.



F. DC Motor



Almost every mechanical movement that we see around us is accomplished by an electric motor. Electric machines are means of converting energy. Motors take electrical energy and produce mechanical energy. Electric motor is used to power hundreds of devices we use in everyday life. An example of small motor applications includes motors used in automobiles, robot, hand power tools and food blenders. Micro-machines are electric machines with parts the size of red blood cells and find many applications in medicine.

IV. METHODOLOGY

To design a Smart Solar Grass Cutter, some parameters need to be considered such as the components to be used in the project, the position of the components, the structure of the main body, the advantages and disadvantages of the design and the safety factors. The Smart Solar Grass Cutter is able to operate autonomously or non-autonomously. Other than that, the important factor is the efficiency. The materials and components selections including the positions are crucial to achieve a better efficiency. This Smart Solar Grass Cutter is a simple design which is optimizing the usage of materials. The overall dimensions are depending on the size or the dimensions of the solar panel. Three motors are used for rear tires and the blade. The height of the roof is depending on the height of the battery. The rubber rotating wheel is used as the front tires as it will automatically change the direction depending on the rear tires. One motor is implemented for each rear tire. The design is cost effective and compatible to the main objectives. Starting from the hand sketch, the prototypeis designed in multidimensional using SolidWorks software. Dimensions of the design are very important and need to be accurate and precise to enhance the safety factor. Arduino microcontroller known as the brain of the prototype and PV panels are the main power supply. The PV panel supplied the absorbed energy to the battery through the solar charge controller. The solar charge controller protected the battery from overcharge as well as to maintain the battery performance. During autonomous mode, the ultrasonic sensor was detecting the obstacle. The sensor transfers the information to the microcontroller regarding the detected obstacle then the microcontroller will act, and the grass cutter will change the direction.Bluetooth module will be used to connect the Smart Solar Grass Cutter with the smartphone. The grass cutter will be controlled by using the smartphone and the direction is depending on the requirement.

V. Calculation

A. Battery

A. Battery

W = 13 Ö 12 = 156 watt hours of total power in the battery. overall watt hours had to charge the battery by means of the electricity coming from the solar panel. 156 watt hours/30 watt = five.2 hours Battery charging isn't 1005.2 hours/0.eight = 6.five hours.

B. Calculate how lengthy a battery will last going for walks time

operating cutting-edge = 156 /12 = 13A In theory = 13A/ 13 = 60 min In reality =13A/13Özero.nine = fifty four min gadgets.

C. sun panel

30 watt, 12v Watt = 30Ö8Ö0.75 = one hundred eighty every day watt hours.

VI. CONCLUSION

This undertaking gives a design approach of an automatic grass cutter operated on solar energy, whose challenge is to cut grass with no need of user interaction. This mission is predicted to be made feasible via the use of sensors to offer an Arduino withc The obstacle is routinely averted, here for obstacle avoidance the

ultrasonic sensor is used. The system also provides strength backup by way of the usage of inverter. The proposed system could be cost efficient with higher reliability.

VII. FUTURE SCOPE

We completed our mission efficaciously with the available sources. however the effects and changes are not up to the expectancies. this can be in addition stepped forward through incorporating the subsequent adjustments to acquire higher effects.The mechanism which we used i.e. scotch yoke mechanism does not given excepted performance. This efficiency may be improved by means of using some other mechanism. and velocity of motor is lessen because we have used heavy material and this fabric can be changed through the use of mild weight cloth .and layout of blades have to be finished primarily based on sorts of grass is used to cut. The venture which we've got completed surly reaches the common families because the grass may be trimmed with minimum value and with minimum time finally this task can also give an concept to the people who can modify and may achieve better effects

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