IoT Based Grass Cutter Using Solar System

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Abstract-This project describes the solar powered automated grass cutter machine which makes the grass cutter machine running through solar energy. The proposed system design eliminate the human efforts in grass cutting field such as lawn. The solar grass cutting machine is a robotic vehicle powered by solar energy and is capable of automated and manual grass cutting. The system uses 12 volt battery to power the vehicle movement motor as well as the grass cutter motor. A solar panel is used to charge the battery so that there is no need of charging it externally. The movement of machine is totally controlled by automatic mode and manual mode. Bluetooth controller play store application runs this machine movement and direction through an Android Application. The main target of this machine is to reduce human efforts.

Keyword: - Solar Panel, Node MCU, Arduino UNO, Mobile Application.

1. INTRODUCTION

When a grass cutter is being moved by human effort and using of fossil fuels is getting outdated method in these days, while people are getting aware about the solar energy. Cutting grass cannot be easily accomplished by elder, younger. Grass cutter moving with engine creates noise pollution due to loud engine and local air pollution due to the combustion in the engine also a motor power engine requires a periodic maintenance such as changing the engine oil, even though electric solar grass cutter are friendly to environment. We usually see the grass cutter machine is used at the housing park and residence bungalow the commercial are like industry area, we usually see the manually and conventional method was used grass cutter machine was used the fuel as source of power. The cost of fuels which are being used for cutters are also increasing. Thus, our aim is to study alternative source of power like solar energy. In addition to this modification will be done to the blade to use different material and non-hazardous to the operator. Thus, providing user friendly and pollution free lawn mowers.A grass cutter is a tool or machine used to cut grass. Grass cutting is a task that demands sufficient knowledge and has to be deliberate due to a few important factors. When a grass cutter is being pushed by human labour and using fossil fuels, it is an antiquated method in today's quick-paced world. Grass was cut with a cutlass in schools, sports fields, hotels, industries, and other public spaces in the past and even now. In the past, people would cut their grass by hand with hand-held instruments like scissors or a lawn cutter that operated manually. And also, there are many improvements that are produced over the year like electric lawn mower, tractor lawn mower, and a lawn.

2. LITERATURE REVIEW AND OBJECTIVE

Prof. C. J. Shende [1] They have created a manually operated equipment that can cut grass in this paper. This gadget includesIt has linear blades and is unaffected by the weather. The primary goal of this paper is to manoeuvre the grass cutter in various directions to create various designs in accordance with specifications. You can change the cut's height by using a link technique. This device is simply operated by unskilled labour.

C. B. Mills [2] Modern better mower models are coming to us thanks to new technologies. To help lower air pollution, low emission gasoline engines with catalytic converters are being produced. To lessen the noise pollution, improved muffling devices are also being fitted. Mowers with batteries are also becoming more practical.These new mowers will quietly cut lawns for around an hour each charge, without the typical cloud of blue smoke hanging in the air, although having a somewhat narrower average cutting swath of only 17–19. The cost is on par with a high-end gasoline-powered lawn mower.

Davidge E D [3] "I intend to convert all of my vehicles to propane. It not only benefits the environment, but it also makes me more productive. Since my crew isn't

wasting time at the petrol station, I can reduce my spending on fuel and labour as well. Propane is a clean-burning fuel that has no additives. Since there is no gasoline filter or carburetor to repair, I can save on maintenance.

Edwin Beard Budding [4] After observing a machine in a nearby cloth mill that employed a cutting cylinder mounted on a bench to trim cloth to make a smooth finish after weaving, Budding got the concept for the lawn mower. Budding discovered that if the mechanism could be installed in a wheeled frame to cause the blades to revolve near to the lawn's surface, a similar idea would permit the cutting of grass.

Ms. Lanka Priyanka [5] In this work, a grass-cutting machine that has tempered blades connected has been constructed. Both manually and automatically operating options are available for this lawn cutter. GI sheet, motor, wheel, Al sheet, switch, wire, square pipe, and insulating material are some of the materials that are frequently utilised.

P.Bulski.[6] Bulski determined that the machine's noise was noise pollution. He studies the sounds produced by machinery, anddemonstrating how to eliminate noise while cutting grass on a lawn or other surface. According to my advice, an electric lawn mower should be used because a gasoline engine causes air pollution to the environment.

Praful P.Ulhe [7] They have constructed a manually driven lawn cutter with spiral roller blades for this article since the effectiveness of cutting is increased by the spiral blades. On the grasscutter is a component called a reel cutter for height adjustment.This grass cutter can cut a variety of grass varieties and used to cut grass uniformly.

Randsome [8] Randsome created the first in 1902. After World War I, JP Engineering of Leicester manufactured a variety of extremely common chain-driven lawn mowers. Around this time, a driver might follow the animals that pulled the big vehicles. The first riding lawnmowers were these. In the United States, Ideal Power mower produced the first gasoline-powered lawn mower in 1914.

Thomas Green & Son [9] He unveiled a lawnmower dubbed the Silens Messor, which translates to "quiet cutter," and it utilised a chain drive to convey power from the cutting cylinder from the back roller. Despite being slightly more expensive, these machines were lighter and quieter than the gear-driven ones that came before them. The popularity of lawn sports increased, which aided in the invention's diffusion. Scythes and domesticated grazing animals were replaced by lawn mowers because they were more effective.

Husqvarna [10] The automated grass cutter, which has been available in Europe for about a decade, is being introduced to the U.S. market this year by a Swedish firm. 3-year period). With a boundary wire installed at your lawn's edge, it functions very similarly to the Robomow. But the Husqvarna design looks after itself. The Husqvarna Automated lawn cutter lives outside, operates when set to operate, and returns to its base automatically for recharging while the Robomow must be taken out, set up, and monitored by the owner

3. MATERIALS AND METHODS

We have used geared dc motor for controlling cutter movement. Operating voltage needed for the motor used in cutter is of 3-12V range battery of approx.120 rpm. We used NODEMCU board for the controlling purpose of the motors which are used for different movement parts. We have used server of Blynk application for controlling purpose of the motors. The all are based on the internet of things. We have used virtual pin of the Blynk app for controlling the digital GPIO pins of NODEMCU (esp8266). We have target to make the lawn mover fully automated and IOT based. We have used voltage distributer for distributing of the voltage from the battery according to our need. We have used relay for controlling of the supply of the from the battery which also controlled by our smart phone. We have used three 3D dc motor driver (L298 H-bridge driver) which is used for the controlling of the motors.

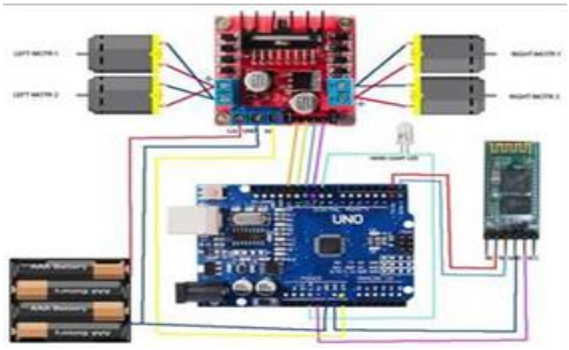


Fig. IOT Based Grass Cutter Using Solar System

We have used IR sensors for obstacles detecting so that it cannot get damage or hit any things for protecting the lawn mower grass cutter. All the connection according to our lawn has shown below .we have used solar panel which is programmed by using ARDUINO IDE as panel is also fully automated. Solar panel is sun tracking which will help to increase the efficiency of the solar panel in any condition and increase the overall efficiency of the grass cutter. We have used eight virtual pins in BLYNK application for all the controlling function the grass cutter.

3.1 ARDUINO UNO

Fig: Arduino UNO

The Arduino Uno is a microcontroller board which has ATmega328 from the AVR family. There are 14 digital input/output pins, 6 Analog pins and 16MHz ceramic resonator. USB connection, power jack and also a reset button is used. Its software is supported by a number of libraries that makes the programming easier.

3.2 HC-05 BLUETOOTH MODULE

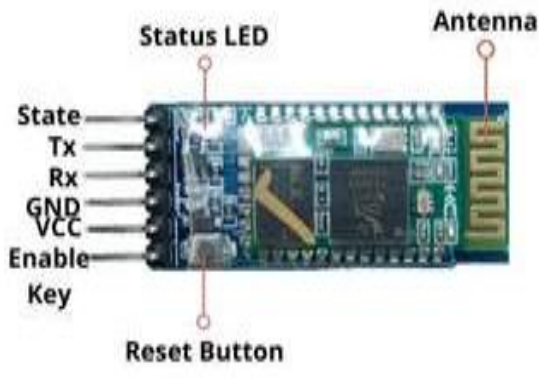


Fig: HC-05 Bluetooth

Bluetooth trans-receiver we used here HC-05 is used to transmit the data from android operating smart phone. It can be operated on 3.3V to 6V DC power supply. Any serial stream from 9600 to 115200bps can be passed seamlessly from device. The range of Bluetooth is 15 meters and works on 2.4GHz ISM band.

3.3 L293D MOTOR DRIVER

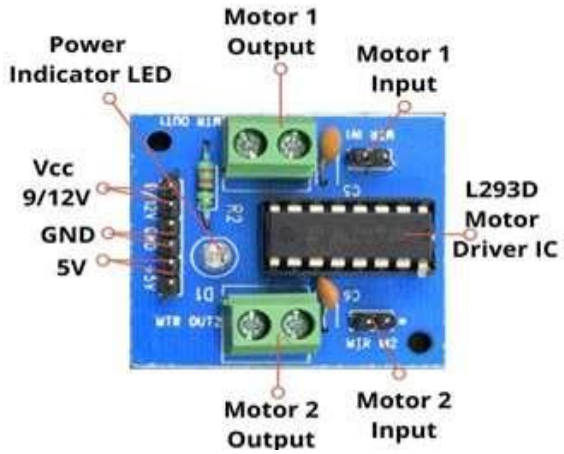


Fig: L293d motor driver

The L293D are quad push-pull drivers capable of delivering output currents to 1A or 600mA per channel respectively. Each channel is controlled by a TTL-compatible logic input and each pair of drivers (a full bridge) is equipped with an inhibit input which turns off all four transistors. A separate supply input is provided for the logic so that it may be run off a lower voltage to reduce dissipation. Additionally, the L293D includes the output clamping diodes within the IC for complete interfacing with inductive loads. Both devices are available in 16-pin Batwing DIP packages. They are also available in Power S0IC and Hermetic DILPackage.

3.4 SOLAR PANNAL

A solar cell or photovoltaic cell is a device that converts solar energy into electricity by the

photovoltaic effect Photons in sunlight hit the solar panel and are absorbed by semi conducting materials, such as silicon.

Electrons (negatively charged) are knocked loose from their atoms, allowing them to flow through the material to produce electricity. Due to the special composition of solar cells, only allow the electrons to move in a single direction

3.5 DC MOTOR

Fig: DC Motor

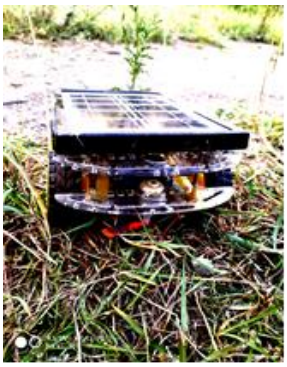
Direct Current (DC) motor is a rotating electrical device that converts direct current, of electrical energy, into mechanical energy. An Inductor (coil) inside the DC motor produces a magnetic field that creates rotary motion as DC voltage is applied to its terminal. Inside the motor is an iron shaft, wrapped in a coil of wire. This shaft contains two fixed, North and South, magnets on both sides which cause both a repulsive and attractive force, in turn, producing torque.

3.6 RECHARGEABLE BATTERY

Fig: Rechargeable Battery

In this project we are using Lead Acid Battery 12v, 2ahm rechargeable battery which is used to store the energy from solar.

4. RESULT AND DISCUSSION



The project entitled with “IOT Based Grass Cutter with Solar energy” is successfully completed and the results obtained are satisfactory. The project is more suitable for a common man as it is having much more advantageous and it can be operated by using solar energy. This will give less physical exertion to the people and can be easily handled. This system has the facility of charging the batteries while the solar powered grass cutter is in motion. Grass cutter can also be operated in night time, as there is a facility to charge these batteries in day light. A workable Iot based solar grass cutter prototype is focusing on the renewable energy as the primary source of energy has been successfully fabricated with high working efficiency.

5. CONCLUSION

The IoT-based grass cutter with solar panel uses innovative technology in an eco-friendly manner. Given that there is no gasoline expenditure, no emissions, no fuel residue, and minimal wear and tear. The solar panel tracks the sun, which improves efficiency and gives the battery a power source. The automated grass cutter is powered by IoT This grass cutter has the unique characteristic of being controllable from anywhere in the globe because to its internet connection, which is accessible via a mobile device. Using this grass cutter will significantly lessen a person's effort while also preventing serious accident from occurring during lawn upkeep. Introducing this grass trimmer into our culture even senior citizens and unskilled individuals can gain access to it, eliminating their dependency on others. The work can be completed much more easily because to the straightforward operating principle. Using the resources at hand, this project was effectively finished,

and the outcomes were adequate. The created model is very effective, and the user can modify the mower's course by instructing it via a mobile device. As a result, equipment can be shielded from harm, which lowers the risk to people. As a result, the newly created robot will be able to handle the challenge of cheap operating costs, simple maintenance, and renewable energy.

6. ACKNOWLEDGEMENT

Inspiration and guidance are invaluable in all aspects of life, especially when it is academic. We fail to find the adequate words to express the deep sense of gratitude to our respected Head of Department of Electronics Engineering MRS. S. S. LAVHATE and Project Coordinator and Guide MR. D. B. Rane who put their careful guidance and interest through which we have completed our project work. The indebt necessity for encouragement, help and sympathetic attitude which we received from them during preparation of our work cannot be expressed in words. Last but not the least we would like to remember our family members with whose continuous inspiration; this work wouldn't have been successfully completed. Every work is the outcome of full proof planning, continuous hard work and organized team effort. This work is the combination of the all above together, sincerely.

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