IOT Based Grass Cutter Using Solar Energy

Niveditha T R[1], Bhuvaneshwari S M[2], Bhoomika N P[3], Likith B G[4], Prof. Apoorvashree H L[5]
[1,2,3,4] *Student, Department of Electrical and Electronics Engineering, Vidya Vikas Institute of Engineering and Technology, Mysuru*
[5]*Assistant Professor, Department of Electrical and Electronics Engineering, Vidya Vikas Institute of Engineering and Technology, Mysuru*

***Abstract*- Green is the colour of beauty of nature, same goes for the grasses. The beauty of the grasses can be enhanced by the proper cutting and adjusting their length. In traditional method of grass cutter IC engines is used which uses fossil fuels to run and thus causing environment pollution. This conventional engine also requires man power to handle. This problem can be overcome by using IOT based grass cutter using solar energy. The proposed grass cutter is totally based on IOT and robotics. The special feature of the proposed model is that it can be controlled from any part of the world by using Cell Phone. It is also capable of fully automated grass cutting without the need of any human involvement.**

***Index terms*- Solar Panel, Nodemcu, Arduino Ide, Blynk Application, Cell phone**

I.INTRODUCTION

A grass cutter is a machine or device for cutting grass. Grass cutting is an assignment that requires adequate information and must be done deliberately on account of certain vital thing. In today's fast-moving world, when a grass cutter is being moved by human effort and using fossil fuels is an out-dated method. In the past and even until now, cutting of grasses in the schools, sports tracks, fields, industries, hotels, public canter, etc. was done with a cutlass.

In earlier days, people were using the manually operating grass cutter like scissors used for trimming the grass is by using the hand devices. And also there are different innovations that are developed over the year like electric lawn mower, tractor lawn mower, and a lawn mower utilizing the diesel and petrol. Where this manually operating device requires more human efforts and more time is required for accomplishing the work and also the lawn mower which utilized by petrol and diesel requires fuel for operation and this grass cutter required maintenance. Traditional design of lawn movers had motored powered engines which required regular maintenance such as engine oil and greasing. They will create a non-uniformity in trimming the grass and they will create a lot of noise and air pollution. In the cold and harsh environment, the fuel powered motors tend to freeze and do not start.

The proposed solar grass cutters are environment friendly; it keeps the environment clean and healthy. The prototype will charge from sun using solar panel. Non-skilled person also can handle it easily by using simple switches or by predetermined programming it can be easily handle and control with less time span. It is highly efficient and accurate because it detects the obstacle and changes the directions or stop functioning has per instruction given. Therefore, equipment can be protected from damage and reduces risk on human. The proposed project explains the applications of green energy. This knowledge can be used in agricultural field as a future scope.

II. PROBLEM FORMULATION

The past technology of grass cutting is manually operated by the use of hand devices. The hand held grass mowing machine like scissors, push lawn mower these are generally small cylinder lawnmower that need to simply push along with muscle power and are not suitable for larger or sloping gardens. Also there are different innovations that are developed over the year like petrol lawnmower, diesel lawn mower, electric lawn mower, tractor lawn mower, with rotary blades for cutting grass on lawn. Which causes heavy sound, environmental pollution, and double check need to be done whether the petrol tank is filled and replace any old petrol, as this can cause problems too. A damaged cable could prevent

power from reaching the lawnmower, as well as having the potential to be a serious risk.

III. METHODOLOGY PROPOSED

A. Block Diagram

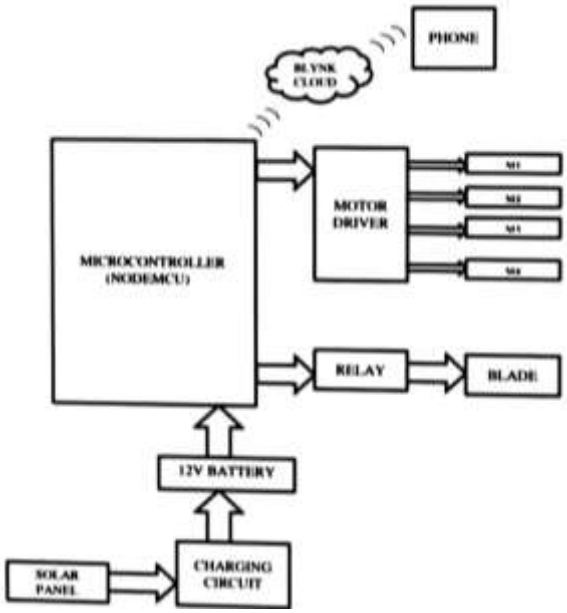

Figure 1: Block diagram of Grass Cutter

The Proposed system consists of solar panel which generates electricity and stores the DC voltage in a battery. The operating voltage needed for the motor used in cutter is of 12V and is fed to a NODEMCU microcontroller board for the controlling purpose of the motor. The motor driver acts as an interface between the control circuit and motors. Motor require high amount of current whereas the controller circuits works on low current signals. So the function of motor driver is to take a low current control signal and then turn it into a higher current signal that can drive a motor.

The relay consist of three pins normally open (NO), normally closed (NC), and Common. On other side of the relay it consists of VCC and input pin. The input for the relay module is given from the NODEMCU which is used for the switching purpose. The system uses the server Blynk application for controlling purpose of motors. They are all based on the internet of things (IOT). The Blynk application consist of eight virtual pins for controlling the digital GPIO pins of NODEMCU (esp8266) and also all the controlling function of the grass cutter.

B. Flow Chart

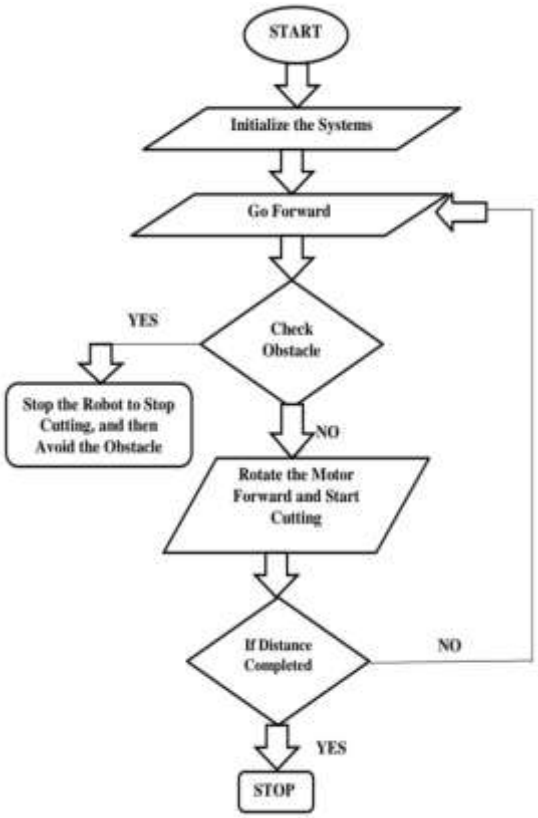

Figure 2: Flow Chart of Grass Cutter

C. Blynk Application

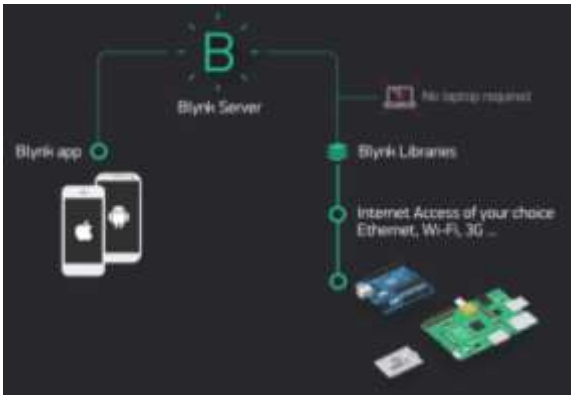

Figure 3: Blynk Application

Blynk application is used to control the Arduino board which is connected to a PC with internet access, from anywhere in the world, with a Smartphone. The connection can also be established by Bluetooth between Smartphone and Arduino board, but this will be not presented in this work. Blynk can be downloading from Google play store. And app store, providing us the dashboard as well as the connectivity to Arduino. Programming of Blynk

is very simple to push and drag widgets from the tools bar and allocating the pins on Arduino board. Such project can be used an ordinary Arduino board, without internet shield. The role of PC is to ensure the connectivity of the Arduino board to the internet and to upload the Arduino code.

IV. RESULTS AND DISCUSSIONS

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 as shown in the Figure 4.

Figure 4: Working Model

The grass cutter is moving to the forward direction and all the four wheels are moving because the user pressed the up button on the android application. As the user pressed the down button the grass cutter starts to move in a backward direction. The cutter is working because the user pressed the cutter on button as illustrated. The grass cutter will stop working as the user pressed cutter off button. As the user pressed the right button in the android application, the grass cutter will start to move in the right direction. Similarly, the grass cutter will start to move in the left direction as the user pressed the left button as shown in Figure 5.

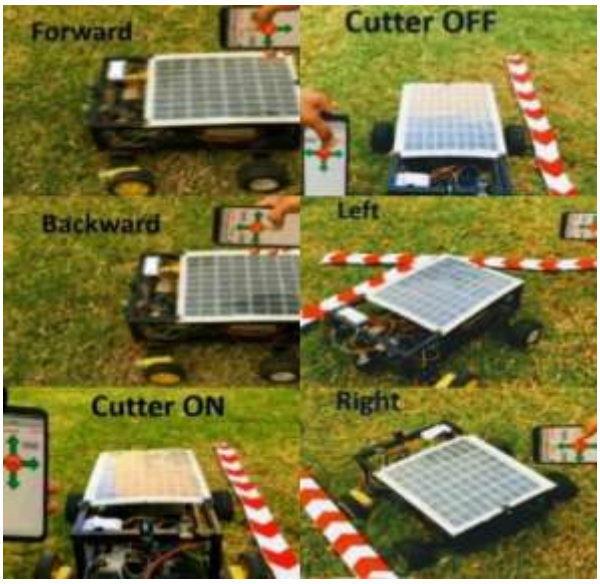

Figure 5: Different Movements of Grass Cutter

The final demonstration of the proposed grass cutting robotic system with four different types of pattern like Circle, Spiral, Rectangle and Continue shapes designing on the grass is as shown in Figure 6.

Figure 6: Different Patterns of Grass Cutting

V. CONCLUSIONS

The use of new technology in the Iot based grass cutter with solar panel is environmentally friendly. Since there is no cost of fuel, no pollution, no fuel residue, less wear and tear. Solar panel is sun tracking which will help to increase the efficiency and providing the power source to the battery. Iot is used for automation of the grass cutter.

Special feature of this grass cutter is that, it can be controlled from any part of the world because it is connected from internet, which can be controlled

from the cell phone. This grass cutter is used to prevent severe injuries during the lawn maintenance and also reduce the efforts of a person drastically.

By implementing this grass cutter in our society even the senior citizens and non-skilled person can make access over it, so that they are need not to be dependent on others. Operating principle is simple such that the work can be carried out even more easily. This project is successfully completed with the available resources and the results obtained are satisfactory. The designed model is highly efficient and the path of the mower is changed by the user by giving an instruction through the mobile phones. Therefore equipments can be protected from the damages and reduces the risk on human. Thus, the newly designed robot will meet the challenge of low cost of operation, easy maintenance and a renewable energy.

REFERENCES

[1] Vicky Jain, "Solar Based Wireless Grass Cutter", International Journal of science Technology and Engineering, Vol.2, 2016, 576-580.

[2] Praful P. Ulhe, "Modification of Solar Grass Cutting Machine", International Journal for Innovative Research in Science & Technology, Vol.2, 2016, 711-714.

[3] Ashish Kumar Chaudhari, "Smart Solar Grass Cutter Robot for Grass Trimming", International Journal of Advance Research and Innovative Ideas in Education, Vol.2, 2016, 1246-1251.

[4] Dipin.A, "Solar Powered Vision Based Robotic Lawn Mower", International Journal of Engineering Research and Reviews, Vol.2, 2014, 53-56.

[5] Sachin Prabha, "Solar Grass Cutter Machine", International Journal for Technological Research in Engineering, Vol.3, 2016, 2702-2706.

[6] T. Karthick, "Grass Cutting Machine Using Solar Energy", International Journal of Research in Mechanical, Mechatronics and Automobile Engineering, Vol. 2, 2016, 1-5.

[7] Tanimola, "Design and Development of Solar Powered Lawn Mower", International Journal of Science and Engineering Research, Vol. 5, 2014, 215-220.

[8] Ms. Lanka Priyanka, "Fabrication of Solar Powered Grass Cutting Machine", International Journal and Magazine of Engineering, Technology, Management and Research, Vol. 2, 2015, 386-690.

[9] Pankaj Malviya, "Fabrication of Solar Grass Cutter", International Journal Scientific Research in Science, Engineering and Technology, Vol. 2, 2016, 892-898.

[10] Guo-Shing Huang, "Intelligent auto saving energy robotic lawn mower". IEEE transaction on robotics. Pg. 4130 to 4136 In 2010.