

# IOT Based Grass Cutter with Solar Pannel

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## ABSTRACT

*In this research paper we are describing latest features and technology used in newly hand made GRASS CUTTER which is totally based on IOT (INTERNET OF THINGS) and ROBOTICS .Special feature of this grass cutter is that, it can be controlled from any part of world because it is connected from internet. We can even control it from our cell phone which is very common gadget installed in everyone pockets. In this device we use ARDUINO IDE software to do all the programming of this device even the slidest movement of wheel. For the up and down motion of grass cutter device named SERVO MOTOR is being introduced . An IR and ULTRASONIC SENSOR is used to detect the location of obstacle and to inform the arm to respond. Finally we are here to talk about the energy used in this device. We have used a BATTERY of capacity 12V, also SOLAR PANELS which will come handy in sunny days and are ENVIRONMENT FRIENDLY .*

## INTRODUCTION

Green is the colour of beauty of nature. Same goes for the grasses. But there beauty can be enhanced by the proper cutting and adjusting there length. we can decorate grass in garden or lawn by using this compact device without any manual effort. Many technical gadgets are introduced to do this job. Our project **(GRASS CUTTER IOT BASED)** is introduced to do the same job but in a technical style by use of our cell phone which is very compact and in daily use. This device is installed with many features such as robotic arm to remove obstacle in its path, ultrasonic sensors to sense obstacle,

solar panels to charge battery and many more. Knowledge of **IOT** and **ROBOTICS** programming is being used in this project. Working of this is as easy and smart. We can move it by inputs given in software. Movement in any direction is controlled easily also cutter is not fixed that is also movable, for security purposes. **ARDUINO IDE** software is used to do all the programming used to do all the programming and to control all the movement of the device such as up- down movement of cutter, rotation of cutter and the rest. Battery is used to store the power collected by sun and to be used in cloudy days. This device is cheaper

than many grass cutter available in market these days.

## WORKING

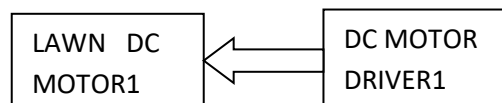
We have used geared dc motor for controlling cutter movement . Operating voltage needed for the motor used in cutter is of 3-12V range battery of approx.120 rpm. We used NODEMCU board for the controlling purpose of the motors which are used for different movement parts. We have used server of Blynk application for controlling purpose of the motors. The are all 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.

We have used IR sensors for obstacles detecting so that it cannot get damage or hit any things for protecting the lawn mover 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 pin in BLYNK application for all the controlling function the grass cutter.



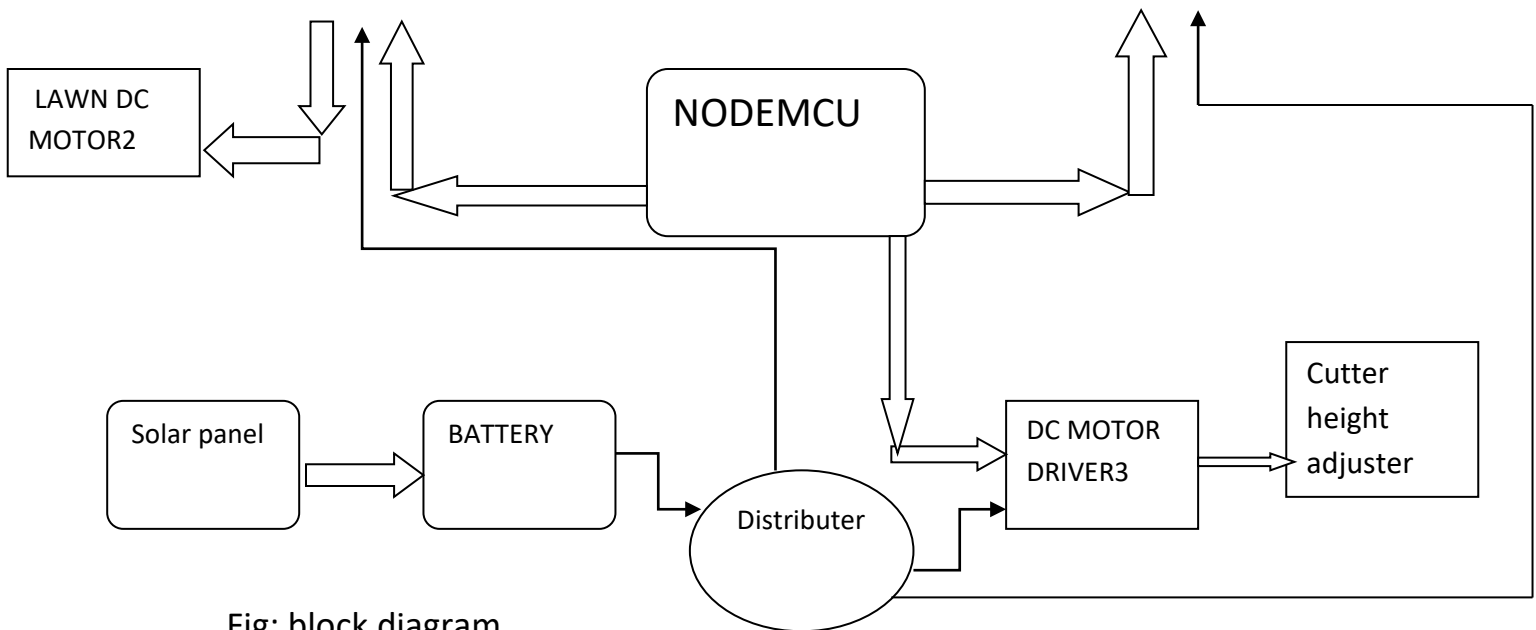


Fig: block diagram

### **COMPONENT USED:**

#### **1 .DC MOTOR DRIVER (L293D)**

It consist of two H-bridge which is the simplest circuit for controlling a low current rated motor .It is a small current Amplifier which takes a low current control signal and then turns it into a higher current signal that can drive a motor.

IC receives signals from the microprocessor and transmits the

related signals to the motors. We have used this types of motor driver which helps for controlling of the dc motors which all are used in this grass cutter. One is used for controlling the motors for two tyres for grass cutter.

#### **2. NODEMCU(ESP8266)**

It is the open source IOT platform which helps us to interact with the sever and hardware for making things automated .It has 8digital pin(GPIO)which are used for controlling the motors and the systems which are used in the grass cutter .We provide 5V input in to Vin

pin . We have used (D1,D2,D3,D4) pins for tyres motors(D5,D6) for cutter & (D7,D8) pin are used for adjusting the height of the cutter.

### 3. IR ,Ultrasonic sensor ,CAMERA

IR sensor are used for obstacle detecting which will not allow the grass cutter to hit it and according to the coding it will change the direction and again continue the cutting .Also there is use of ultrasonic sensor which provide us information about the length of the grass being cut. We have done the coding which will automatically helps the cutter to lift if there is any small obstacle which may harms the baled of the cutter.

Camera will detect the any obstacle other than grass which will send the signal to the system and then will

make the cutter to get up ward.



Fig . Grass cutter

### 4. SOLAR PANNEL AND BATTERY

We have used battery of 12V which is charged by using solar panel which is fully automated. Initial current of the battery is less than 0.39A and is rechargeable .

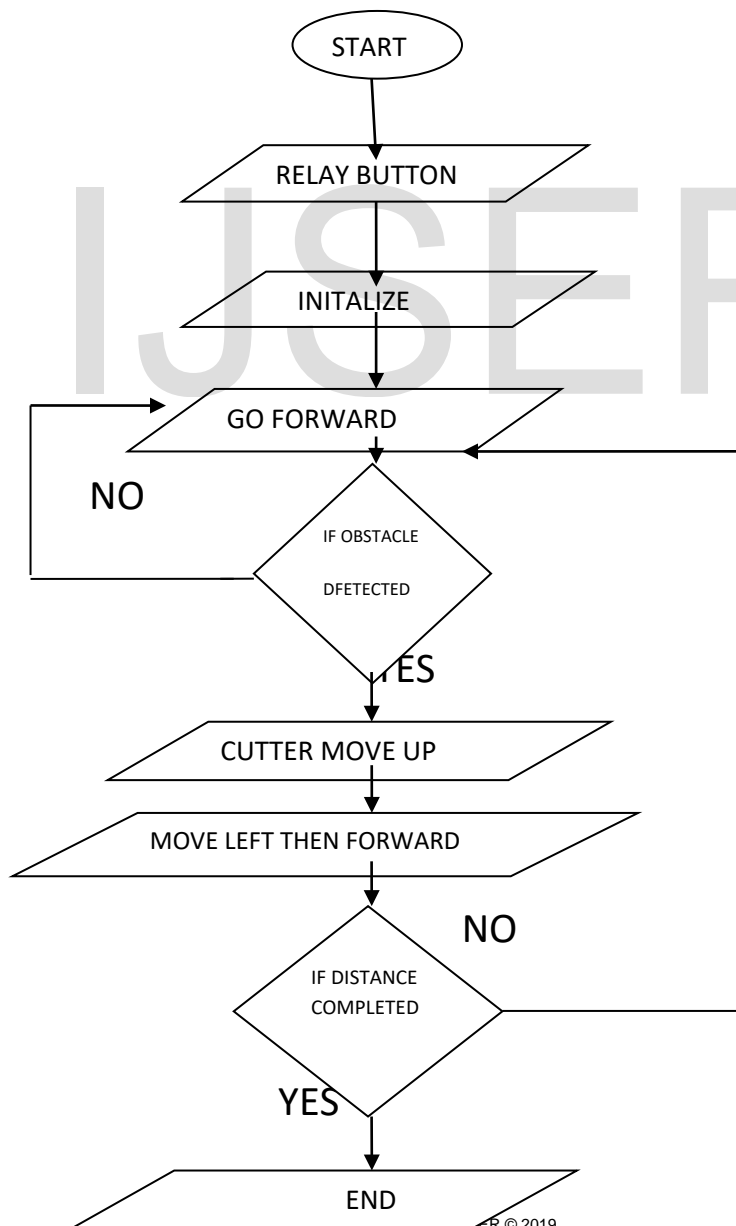
There is use of power supply distributor which provide 4 pins of 12V , 5V and 3.3v . First 12v battery supply is converted into 5V and 3.3V which is needed for whole system.

## 5. ARDUINO UNO

We have use ARDUINO UNO for the controlling the height of the cutter according to the response of the IR sensor whenever there is any obstacle in the path of cutter which may harm the blade then UNO is

programmed to take the cutter up . ARDUINO board is one of the most easy and compatible board for the purpose of doing any research work in the filed of the automation and basic embedded for controlling the thing through coding.

Flow chart:



## Conclusion:

This paper has presented the advance use of the new technology in the fully automated grass cutter. Solar panel is environment friendly which is one of the best part of research paper for providing the power source to the battery and IOT is used for automation of the grass cutter. Also the main feature we have given is that we can trim the grass at different level according to our choice by using mobile phone .

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