HIGHWAY PLANT SHAPING MACHINE USING NODE MCU

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ABSTRACT:

The overgrown branches of the plant in the highway causes disturbance to the vehicles. The cutting of these overgrown branches from the plant is found difficult by means of manual. Therefore a machine is created using Node MCU for cutting the overgrown branches .In order to reduce the work and time.

KEYWORDS: *Disturbance, Reduce work, WLAN.*

1. INTRODUCT ION:

Generally oleander plants are planted in the highways. They do not grow much taller and requires only less care .But they grow in dense and causes disturbance to the vehicles. It is very difficult to the shape the plant using labour. So a machine is created for shaping the plants and it is controlled using Node MCU. The NODE MCU is used to control the motion of the machine(forward , backward and turn the sides) . The Node MCU is based on internet of things(Iota). It consists of transmitter and receiver. The transmitter (mobile hotspot) send signal to the receiver(Node MCU) for the motion. A motor drive is used to control the motor . Three blades are used for the shaping of the plants. Three high speed motors are attached to the blades for rotation. These motors operate on DC current . The motor used for motion is of high torque with low speed. It is controlled by a specific phone app. The Node MCU Wi-Fi module is connected with the mobile phone via hotspot. The online connection to the Internet is important. The programs are written in web server. The motion is given to the back wheel and the front wheel is used for turning.

2. COMPONENTS USED:

The components used are given below. They are:

Table-1:components and its specifications

COMPONENTS	SPECIFICATION
DC MOTOR	12V,SLOW speed & 12V, HIGH Speed
CIRCULAR BLADES	40 cm diameter Steel plate
NODE MCU	ESP82666 Wi-Fi SOC
STEPDOWN TRANSFORMER	240V to (5V-12V)AC
MOTOR DRIVE	12V , L293D IC

3. NODE MCU:

It is an open source based on Iota platform. It runs on ESP8266 Wi-Fi SOC from ESpressif – system. It uses Lua scripting language. It is single board micro-controller. Its operating system is XTOS. It can store 4MB . Its memory is 128KB. Power is given through USB Port . The smart phone is directly connected to WLAN through mobile hotspot or Wi-Fi. There is no need for the password. To find out the IP address, connect the Node MCU to your PC via USB, start the serial monitor. After pushing the reset button the serial monitor will show you the IP address. Enter the IP address in the URL field of your web browser.

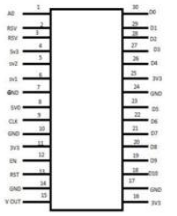

Fig-1: Pin Diagram of node MCU

4. MOTOR DRIVE:

L293D is a motor driver IC which allows DC motor to drive on either direction. L293D is a 16 pin IC which can control a set of Two DC motors simultaneously in any direction . The L293D can drive small & even big motors as well.

The L293D is designed to provide bidirectional drive current of up to 600mA at voltages from 4-5v to 36v.

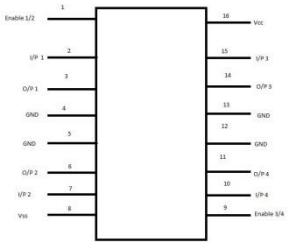

Fig – 2: Pin Diagram of Motor Drive.

Pin 1: If Enable 1/2 is HIGH , then the left part of the IC will work , i.e., the motor connected with pin 3 & pin6 will rotate.

Pin2: The input 1, is HIGH then the current will flow through the output 1.

Pin 3: the output 1,is connected to the output terminal or the motor.

Pin 4&5: These are the ground pins (GND).

Pin 6: The output 2, is also an output terminal and it is connected to the motor.

Pin 7: The input 2, if the input is HIGH in this pin , then the current will flow through the output 2.

Pin 8: The VSS, it is used to give power to the connected motors from 5v to 36 v. It depends on the motor.

Pin 9: The Enable3/4 , if this pin is HIGH , then the right part of the IC will work. i.e., the motor connected to the pin 11 & 14 will rotate.

Pin 10: the input 4, if this pin is HIGH , then the current will flow through the output 4.

Pin 11: The output 4, it is an output terminal and it is connected to the motor.

Pin 12 & 13: These are ground pins(GND).

Pin 14: The output 3, it is also an output terminal and it is connected to the motor.

Pin 15:The input 3, if this is HIGH , then the current will flow through the output 3.

Pin 16: The VCC, it supplies power to the IC (5V).

5. CONSTRUCTION:

The machine frame is made up of normal mild steel and the dimensions are given below:

The length of the frame is 45cm.

The breadth of the frame is 30cm.

The height of the frame is 75cm.

The frame is made in rectangular shape. In order to place it in the highway track. The joints are welded . The blade motor is placed in the slotted angle. Two blades are fixed vertically and one blade is fixed horizontally to cut the branches. The slotted angle is used at the bottom to connect wheel with the motor. These slotted provide support to the motor .The steering is made by joining two small rods in the plus shape for turning .The slotted angles are joined to the frame using bolt and nuts. Silk wire is used to for connecting the motors. An thermacol is placed at the top to provide insulation. The transformer and other electrical and electronic components are placed at the top of the machine.

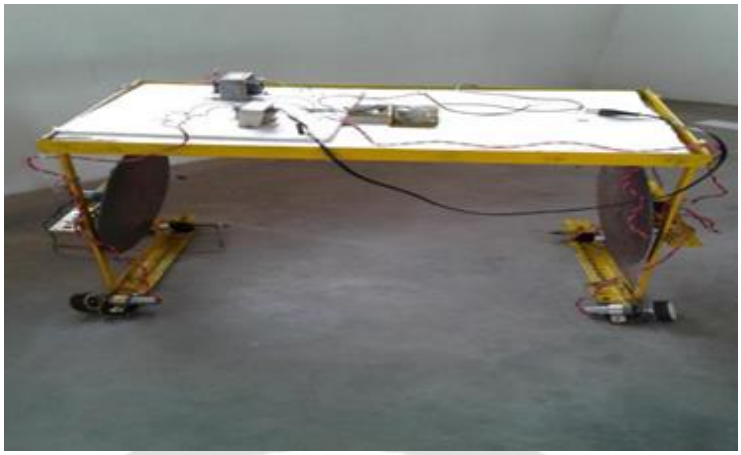

Fig-3 Top and Front view of the machine.

Fig-4 Side view of the machine

6. WORKING:

The process starts with the placing of the machine in the lawn . The machine is controlled using mobile hotspot or Wi-Fi. The machine is start by pressing the start button in the app. The start and stop function is controlled using the app. After the start button is pressed , the blades starts to rotate in the clockwise direction. The blades function cannot be controlled once the machine is start. The app consist of start , stop and directions button in it. The machine does not cut the entire plant , it only cuts the overgrown branches. The cutted branches are left behind. The plant are cutted identically throughout the entire process. The is made to cut the appropriate size of the plant only. The servo motors are used for the turning purpose. The servo motor turns right and left according to the command.

7. CONCLUSION:

When compared to manual , the machine is more efficient. It can cut more plants at the same time when compared to humans. The shaping of the plants are common in the machine, but it is very difficult to get identical shapes in the case of humans. The main aim of the project is reduce the human work and time in shaping of the plants. And it is achieved in this project. This machine is easy to handle and it does not require any special skills.

8. REFERENCE:

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