

A Portable and Automatic Weed Cutter Device

Ashwini D. More¹, Sayali N. More², Varsha V. Shetty³, Shweta V. Patil⁴
^{1,2,3,4}(Electrical department/ R.I.T. Rajaramnagar, India)

Abstract: Automation is rapidly taking place in the present technology and agricultural field is not exception for it. Automation will be beneficial to development in agricultural field and comfort for farmers also. In this project we have automated the machine for cutting the weeds. The device consists of cutter operated under the control of microcontroller 8051 whereas power supply for the motor is by using battery which can be charge by solar panel. In case of any obstacles in the path it is sensed by using an IR sensor. This is fully automatic and renewable energy based project. Solar energy is used along with 12V battery and dc-dc converter and stored in the battery. Here we are using sensor based technique for sensing the position and obstacles in the path. This is an environment friendly project.

Keywords: GSM module, IR proximity sensor, Microcontroller 8051, Motor driver, RS 232

I. Introduction

Most of the part of our country depends on agricultural field. To reduce human efforts in this field, idea of automation should be applied effectively. Robotic technology will lead improvement in agricultural production whereas it will reduce manual efforts with better accuracy. The main idea of this project is 'No More Weeds'. After studying previous research papers we came to know that this system is till not fully automatic. Second observation came out that we can use renewable energy in proposed system.

The design of automatic and portable weed cutter vehicle consists of D.C. motor, solar panel, a rechargeable battery, sensors, a cutter etc. a control of device will be based on microcontroller 8051 whereas power supply will be maintained through solar panel. Sensors will sense the obstacle and direction for the vehicle. The Bluetooth module is used to control speed and direction of weed cutter. This report describes the system design with results for automatic control of the device.

II. Literature Review

1. Solar bases wireless grass cutter (IJSTE - International Journal of Science Technology & Engineering , May 2016)

The idea of autonomous machine used to reduce man power with efficient work has given in this paper. Mainly this paper explains application of green energy. This knowledge can be used in agricultural field as a future scope.

2. Sensor based multipurpose agricultural cutter (International Research Journal of Engineering and Technology (IRJET))

This paper gives description of multipurpose grass cutter which is sensor based for special purposes like in grass trimming, hedge trimming etc. utilization of sensor and design calculation are used in proposed system.

3. A Review on Agricultural Robots (International Journal of Advanced Research in Computer Engineering & Technology (IJARCET))

After taking review of various types of agricultural cutters we decided to proposed a model to cut the weeds which are restricts the growth of the plant with a portable and automatic weed cutter vehicle.

III. System Description

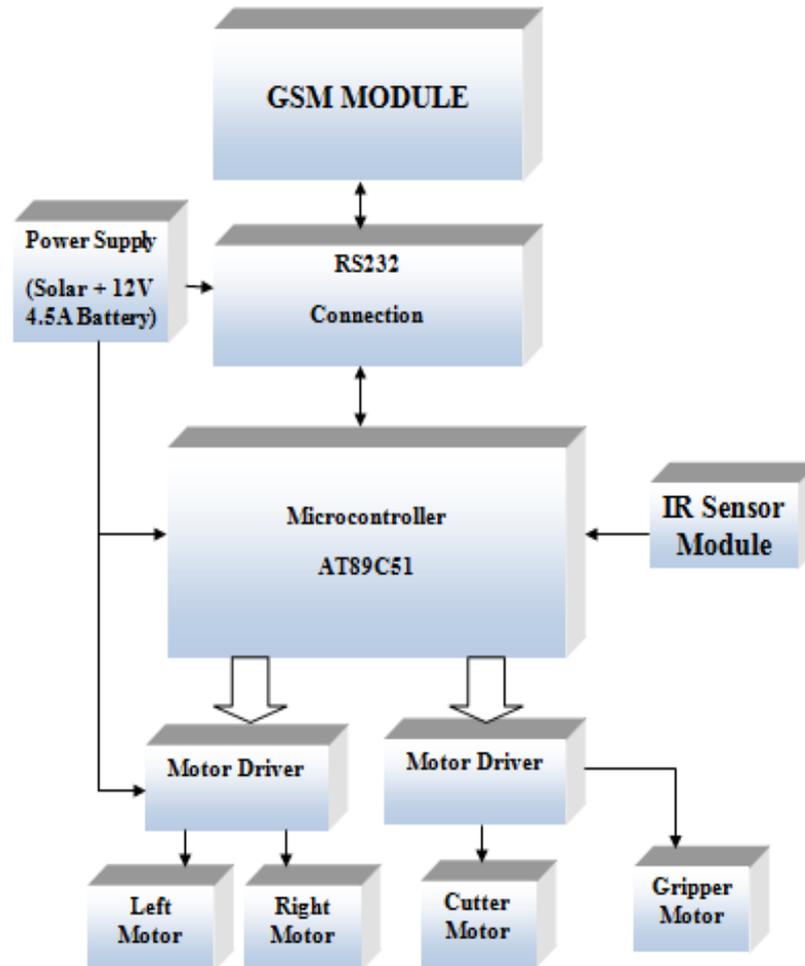


Fig. 1. Block diagram for weed cutter vehicle

1) Hardware assembly

Hardware Requirement for assembly of proposed model:

- Microcontroller-AT89c51
- MAX232
- GSM module
- 12V 300 RPM Moto(for grinding motion)
- 12V 3.5RPM Motor(for upward and downward motion of cutter)
- Two 12V 60RPM Motor(for forward and backward motion of vehicle)
- Motor Diver (L293D)
- IR Sensor Module
- Power Supply (7805,1N4007)
- Crystal 11.0592MHz
- Capacitor 22pf(2pcs), 104pf(5pcs)

3.1 Mechanical assembly

The assembly of weed cutter vehicle consists control of microcontroller 8051 and power supply with solar energy. PCB is designed by using software Express PCB. A rechargeable battery gives supply to microcontroller which gives input to the two motor drivers. GSM acts as connecting media between user and proposed model whereas MAX 232 is used as transfer media. Solar panel is mounted above the assembly to charge the battery.

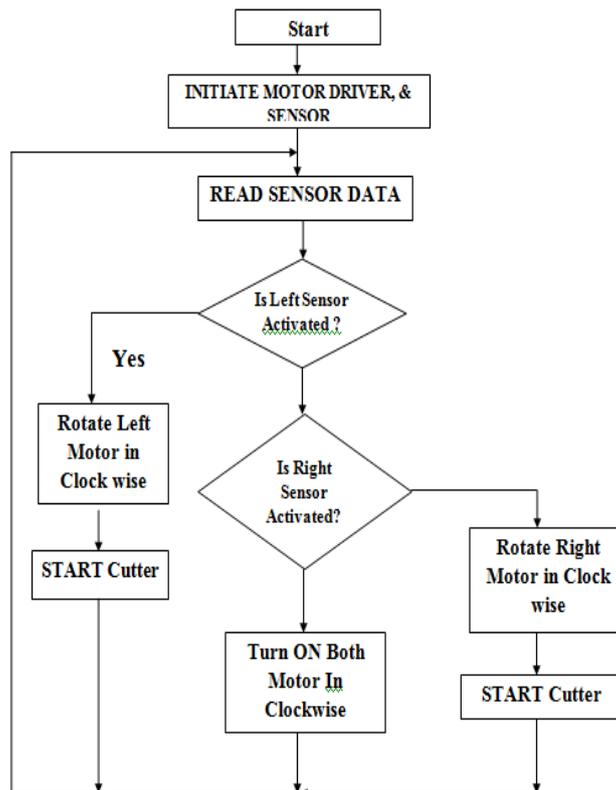


Fig. Mechanical assembly of proposed model

3.2 Operation of weed cutter device

In the proposed model solar panel is placed on the top of the system. The solar energy is converted into electrical energy based on the photovoltaic principle used as power supply for the system. For the working of model, first initialize the starting point for system in the field inspection, IR proximity sensors produces signal. Microcontroller 8051 read the sensor data and output of microcontroller is given to the motor driver input pin 2, 7, 10, 15. One motor is connected to output pin 3, 6 and another motor is connected to output pin 11, 14 of motor driver. As per sensor data instruction left or right motor move in clockwise direction otherwise it moves forward. Simultaneously the cutter motor and actuator motor are connected to output pin of another motor driver. In such a way the photovoltaic principle is used to produce power and sensor technology along with microcontroller develop automation technique.

IV. Hardware Simulation



V. Conclusion

In present scenario large amount of work in agricultural sector done by manually or depends on some traditional way. This environment change after some year when technology introduce such type of automation based application in this field. This proposed model of weed cutter vehicle is replacement of the manually operating different type of tools. This cutter is based on solar energy, plays vital role in agriculture sector and totally eco-friendly. This vehicle is easy to operate, pollution free and automatic. As this cutter vehicle design is automatic, reduce the manual efforts. This system lead to improve the agricultural production. Future scope of this system can be gives as that as per motor specification, design of cutter will be changed. By increasing cutter strength and by changing construction of blade the vehicle can be used for different application.

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