

Design and Fabrication of lawn mower using RF module

A. Roshan zamir¹, M. Arun kumar², M. Subash³, Prof. C. Vibin stalin⁴

^{1,2,3}Students, Department of Mechatronics Engineering, Paavai Engineering College(Autonomous), Pachal Namakkal, India-637018

⁴Assistant Professor, Department of Mechatronics Engineering, Paavai Engineering College(Autonomous), Pachal Namakkal, Tamil Nadu, India-637018

Abstract - The present technology ordinarily used for trimming the grass is by exploitation the manually handle device. In this paper we have automated the machine for trimming the grass. The device consists of linear blade that is operated with the assistance of the motor the facility offer for the motor is by exploitation battery. This project is associate degree autonomous garden tool which will enable the user to the flexibility to chop their grass with lowest effort. Unlike different robotic field mowers on the market, this design requires no perimeter wires to maintain the robot within the lawn. The project summarizes and reviews different technological development for making efficient and cost effective lawn mowers. The lawnmower is a machine to make cutting grass process easier. The lawnmower movement will be controlled using RF module.

Key Words: Battery, Motor, Rf module, Blades, connecting wires.

1. INTRODUCTION

The aim of paper is to reduce human accidents and air pollution by independent of fossil fuels. The project is developed to automatically operate without any human need saving labour power and time now a days the scope of lawn mower plays the vital role in every aspects such as industries, colleges, homes etc., to make more creative and attractive they tend to plant grass in and around the infrastructure. Here the lawn mower is used for shaping and trimming as per the need. With the assistance of a lawn tool that could be a machine with revolving blades to assist USA cutting lawns at even length, individuals will simply maintain and beautify their lawns and gardens without any hassle. In previous days they use motor powered push lawn mower for trimming the grass which resulted in human accidents, create noise pollution due to loud engine and local air pollution due to the combustion in the engine. Due to technology development large size, and manually operated vehicles are reduced in their size and automated without reducing its efficiency and working performance. Fully Automated Grass Cutting device is a device which cuts the grass on its own. This device reduces both environmental and noise pollution. It is made with help of grass cutter, DC motors, motor driver, RF module, robotic body.

2. EXISTING SYSTEM

The star grass cutter has panels mounted AN exceedingly| in a very arrangement at an angle in such the way that it will receive radiation with high intensity simply from the sun. These star panels convert solar power into power. This machine consists of the photovoltaic, dc to dc converter, motor, controller, linear blades, and battery. It is an automatic system for the aim of grass cutting. Solar Grass Cutter uses solar power as an energy source that addresses a number of issues that standard internal combustion engine mowers do not. An electric grass cutter with a star charger are easier to use. There is no mussy, dangerous hydrocarbon to take care of, most significantly it eliminates the emissions of an indoor combustion lawn mower. An Arduino Uno control board will act as a processing unit and direct the entire working of the mower as per a presented programmer. The motion of the mower is controlled by four DC motors of 200 rpm. A height adjustment rack and pinion mechanism has been incorporated to the cutter motor to enable different heights of cutting. A Solar panel will charge the battery and eventually power six motors, four of which are for motion of the mower and the other two are of the cutter blade and height adjustment mechanism of the cutter. IR Sensors are used to detect and avoid obstacles.

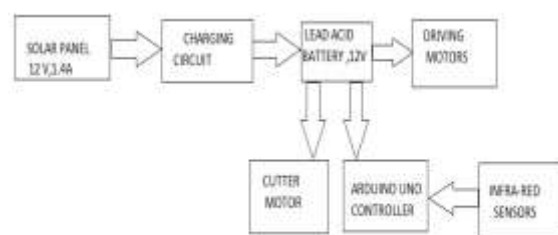


Fig-1: Block Diagram of Existing Mower

3. METHODOLOGY

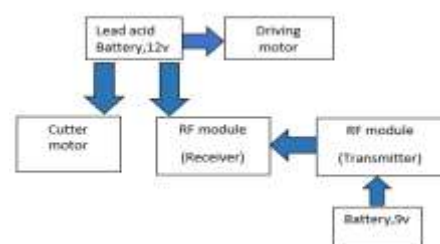


Fig-2: Block Diagram

The block diagram of overall system is as shown in fig .2 rechargeable battery has been used Grass cutter model used DC motor to convert the electrical energy into mechanical energy that additionally interfaced with blades for cutting the grass. In this system uses two batteries 12v battey connected with RF(Receiver) power the vehicle movement motor as well as the grass cutter motor and 9v connected along with RF(Transmitter) to control the movement. Has panel mounted specifically arrangement so it will receive solar power from the sun. Motor connected to the battery. This motor starts and stops with the assistance of motor drive. Thus power delivered to the mechanism which forces it to rotate blades and cut the grass.

433 Mc RF Transmitter and Receiver: In several comes we have a tendency to use RF modules for transmit and receive the info as a result of it's high volume of applications than IR. RF signals travel within the transmitter associated receiver even once there's an obstruction. It operates at a specific frequency of 433MHz.

Table -1: Spectrum band

Designation	Abbreviation	Frequencies	Free Space Wavelengths
VLF	Very Low-Frequency	9KHz-30KHz	33km-10km
LF	Low Frequency	30KHz-300KHz	10km-1km
HF	High Frequency	3MHz-30MHz	100m-10m
MF	Medium Frequency	300MHz-3MHz	1km-100m
VHF	Very High-Frequency	30MHz-300MHz	10m-1m
UHF	Ultra High Frequency	300MHz-3GHz	1m-100mm
SHF	Super High Frequency	3GHz-30GHz	100mm-10mm
EHF	Extremely High Frequency	30GHz-300GHz	10mm-1mm

RF Module

Features

- 433 MHz RF Transmitter and Receiver.

DC motor

Features

- Motor regulation:24000 RPM.
- Maximum current specification: 115mA.
- Rated voltage:6V.
- Torque:>250g.cm(according to blade).
- Insulation resistance:>10ohms.

Motor Drive Module (L298D)

Features

- High operating voltage, which can be up to 40 volts.
- Large output current, the instantaneous peak current can be up to 3A.
- With 25W rated power.
- Drive voltage: 5-35V.
- Logic voltage: 5V.

Battery

Features

- Optimal starting power.
- Mountable in virtually any position.
- 15 times more vibration resistant.
- Faster recharging.
- Up to 3*longer life.

4. Result and conclusion



Fig-3: Overall hardware kit

The lawn mower project is designed to reduce the time and manual labour required for lawn clearing. The use of physics and AI helps by increasing the potency of the work done. The use of RF Module makes this lawn mower more pollution free and cost effective. The concept of controlling the lawn mower by RF Module solves the requirement of man's presence near the mowing site. The smart lawn mower design is achieved minimum working time, minimize the price, minimum energy consumption, and mixed operation mode. In future a grass assortment box may be mounted.

REFERENCES

- 1) Wikipedia contributors. "Lawn mower." Wikipedia, the Free Encyclopedia. Wikipedia, accessed 18 Apr. 2018
- 2) Ashish Kumar Choudhari, "Experimental study of electricity based grass cutter".

- 3) C.P.Fundamentals of renewable energy systems, New Age international limited publishers, New Delhi, 2005
- 4) Guo-Shing Huang and Keng-ChihLin proposed“Intelligent auto saving energy robotic lawn mower”. IEEE transaction on robotics .pg 4130 to 4136, 2010
- 5) Sivarao, T J S Anand, Hambali, Minhat, Faizul , “Review of Automated Machines towards Devising A New Approach in Developing Semi Automated Grass Cutter ”, International Journal of Mechanical and Mechatronics Engineering IJMME-IJENS, 2010.
- 6) Pratik Patil, Ashwini Bhosale, Prof. Sheetal Jagtap, “Design and Implementation of Automatic Lawn Cutter”, International Journal of Emerging Technology and Advanced Engineering, 2014.

BIOGRAPHIES



Mr. A.ROSHAN ZAMIR pursuing Engineering in Mechatronics department from Paavai Engineering College, Namakkal, India.



Mr. M. ARUN KUMAR pursuing Engineering in Mechatronics department from Paavai Engineering College, Namakkal, India.



Mr. M. SUBASH pursuing Engineering in Mechatronics department from Paavai Engineering College, Namakkal, India.



Mr. C.VIBIN STALIN, Assistant Professor in Mechatronics department from Paavai Engineering College, Namakkal, India.