Solar Based Wireless Grass Cutter

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Abstract

this project is an autonomous grass cutter that will allow the user to the ability to cut their grass with minimal effort. Unlike other robotic grass cutter on the market, this design requires no perimeter wires to maintain the robot within the grass. In this project we have designed remote control grass cutter that eliminated the need of physical power. Throughout this paper you will learn more on how we were going to complete this project and what various parts were used that replaced the physical power needed in moving the grass cutter. Documentation includes all major design aspects. This project will continue in hopes to market the design.

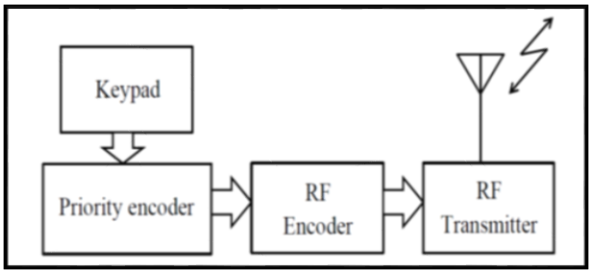
Keywords: Solar system, Wireless system, Grass cutter with Motor driver

I. INTRODUCTION

In the time where technology is merging with environmental awareness, consumers are looking for ways to contribute to the relief of their own carbon footprints. Pollution is man-made and can be seen in our own daily lives, more specifically in our own homes. Due to the effect of emission of gases from the burnt fuel into the atmosphere, this necessitates the use of the abundant solar energy from the sun as a source of power to drive various type of agricultural equipment's. This project of a solar powered automatic grass cutter will relieve the consumer from mowing their own lawns and will reduce both environmental and noise pollution. This design is meant to be an alternate green option to the popular and environmentally hazardous gas powered lawn mower.

The design of solar powered agricultural equipment (e.g. grass cutter) will comprise direct current (D.C) motor, a rechargeable battery, solar panel, a stainless steel blade and control switch. The automatic grass cutting machine is a machine which is going to perform the grass cutting operation by its own which means no manpower is required. The purpose of this project is to design and build a remote controlled grass cutter. This will be beneficial because man power is not required in handling cutter on those hot summer days, where you will prefer not to be out in the sun. The remote will allow the user to control the speed and direction of the grass cutter. Throughout this report will learn more on how we will go about completing this project and what various parts will be used that replaced the physical power needed in moving the grass cutter.

II. THE SYSTEM ARCHITECTURE



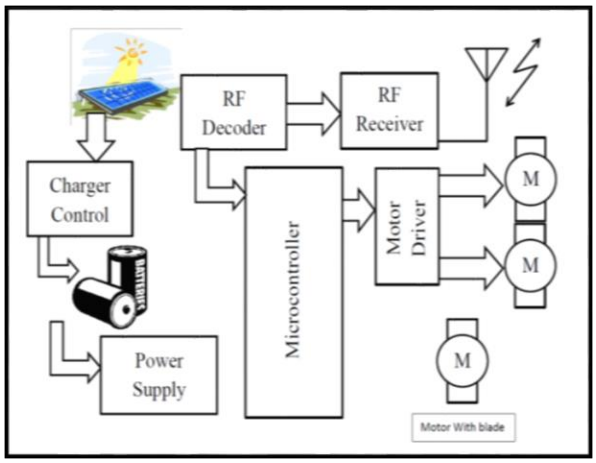


Fig. 1: Block diagram of Solar Based Wireless Grass Cutter

III. BLOCK DIAGRAM DESCRIPTION

A. Transmitter:

1) Power supply:
The remote uses 9V battery to power the transmission of signal for movement of motors as well as the grass cutter motor.
2) Keypad:
It consist of eight key's in which four are used for moment of robot (i.e. left, right, forward and back) and four are used for future purpose i.e. if any new things or any sensors are added in system for controlling them these are available.
3) Priority Encoder:
9-input priority encoders accept data from nine active LOW inputs and provide a binary representation on the four active LOW outputs. A priority is assigned to each input so that when two or more inputs are simultaneously active, the input with the highest priority is represented on the output. The devices provide the 10-line to 4-line priority encoding function.
4) RF Encoder:
We are using RF Module as wireless media. Signal is given from keypad which consists of buttons. RF Encoder will encode the 4bit data/signal given from keyboard; Encoded in a single bit output at encoder and transmitted to the receiver.
5) RF Transmission:
Here a single bit data is transmitted to the receiver and as per data operation will occur.

B. Receiver:

1) Solar system with control charger:
We are using a solar panel to charge the battery so that there is no need of charging it externally. Our system requires 1 amp current and 12 volt voltage for this we are using 20 watt solar panel. For controlling back current or safety of solar cell we are placing charge control.
2) Power supply:
It consist of battery about 15 volts for storing energy from solar system. This is applied to regulator for further operation.
3) Arduino (microcontroller):
It is heart of our system. The entire periphery is interfaced with controller for movement of system. An Arduino board consists of an Atmel 8-, 16- or 32-bit AVR microcontroller with complementary components that facilitate programming and incorporation into other circuits.

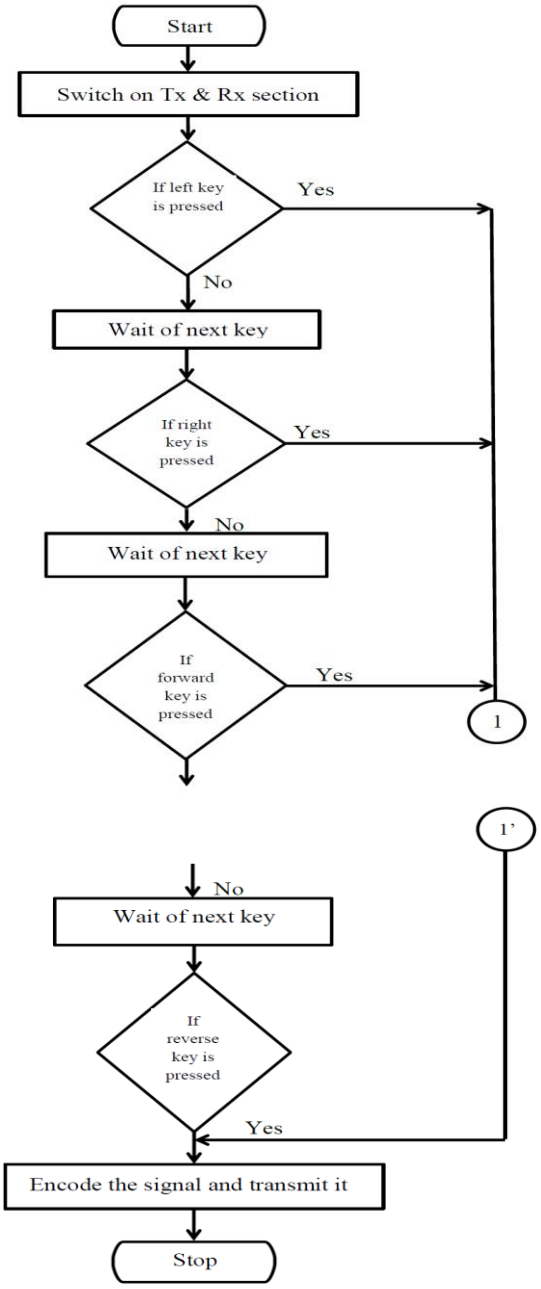
An important aspect of the Arduino is its standard connectors, which lets users connect the CPU board to a variety of interchangeable add-on modules known as shields. Some shields communicate with the Arduino board directly over various pins, but many shields are individually addressable via an I²C serial bus—so many shields can be stacked and used in parallel. Official Arduino have used the megaAVR series of chips, specifically the ATmega8, ATmega168, ATmega328, ATmega1280, and ATmega2560. A handful of other processors have been used by Arduino compatibles. Most boards include a 5 volt linear regulator and a 16 MHz crystal oscillator (or ceramic resonator in some variants), although some designs such as the LilyPad run at 8 MHz and dispense with the on board voltage regulator due to specific form-factor restrictions. An Arduino's microcontroller is also pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash Memory, compared with other devices that typically need an external programmer. This makes using an Arduino more straightforward by allowing the use of an ordinary computer as the programmer.
4) RF Receiver:
Here a single bit data is received from the transmitter and as per data operation will occur.

5) RF Decoder:
We are using RF Module as wireless media. Signal which is received at RF receiver then decoded in 4 bit format at RF Decoder. And operations will occur.
6) Motor Driver:
It is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal.

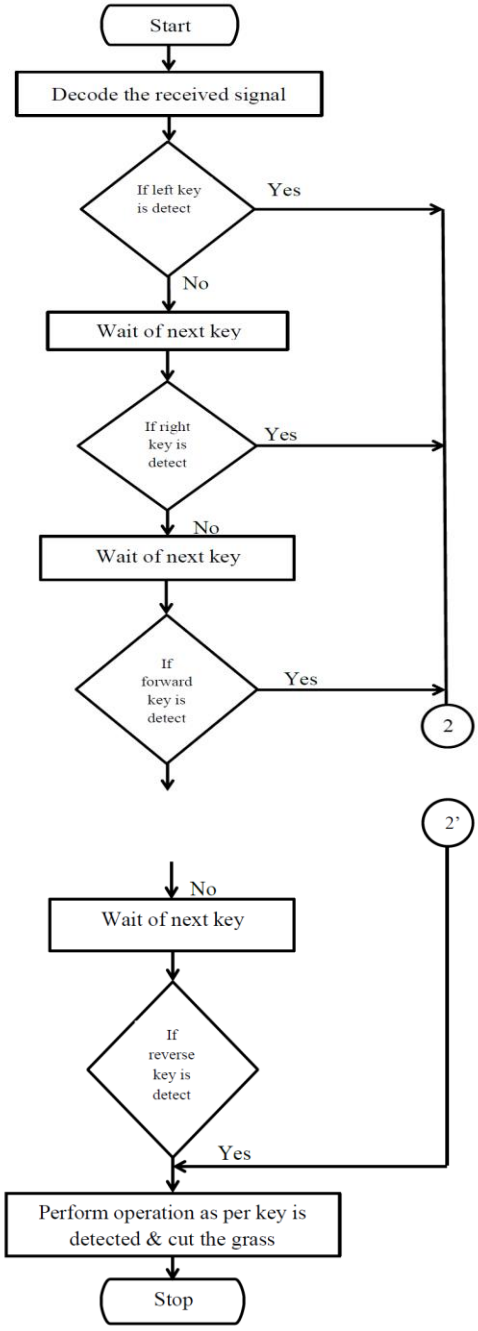
This higher current signal is used to drive the motors. L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input logic at pins 2 & 7 and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively.

IV. SYSTEM FLOW

A. Transmitter:



B. Receiver:



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V. RESULT AND CONCLUSION

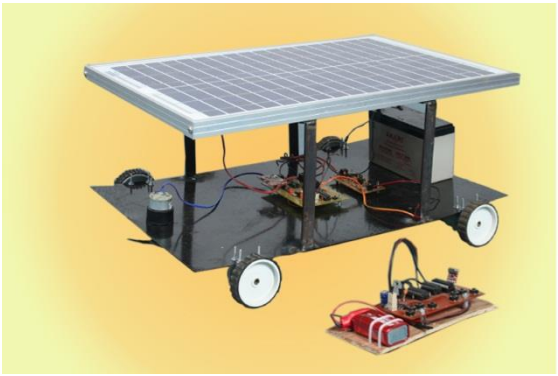

Fig. 2: Final Design of Our System/Project

VI. CONCLUSION

Due to the power demand we choose the renewable energy. So there is no running cost. Our project entitled Manufacturing of solar powered grass cutter is successfully completed and the results obtained are satisfactory. It will be easier for the people who are going to use this project for the further modifications. This project is more suitable for a common man as it is having much more advantages i.e. no fuel cost, no pollution and no fuel residue. This system is having facility of charging the batteries while the solar powered grass cutter is in motion. So it is much more suitable for grass cutting also. The same thing can be operated in night time also, as there is a facility to charge these batteries in day light. The DC motor is operated in low power with high efficiency. The battery is charged by the solar panel in a constant voltage. We met all the requirements and completed our goals for this project. This project eliminated the physical power required in pushing the mower without sacrificing safety.

REFERENCES

[1] P.Amrutesh et al. Int. Journal of Engineering Research and Applications www.ijera.com ISSN : 2248-9622, Vol. 4, Issue 9(Version 3), September 2014, pp.10-21
[2] Basil Okafor International Journal of Engineering and Technology Volume 3 No. 10, October, 2013 Federal. University of Technology Owerri, Imo State, Nigeria.
[3] International Journal of Science and Research (IJSR) Volume 3 Issue 3, March 2014 Sujendran .S1, Vanitha .P21Sri Muthukumaran Institute of Technology, Embedded System Technologies,Chikkarapuram, Near Mangadu, Chennai-69, India
[4] Chong Chen and Jonathan Derr,Department of Engineering Technology and Industrial Studies,Middle Tennessee State University,Murfreesboro, TN 37132.
[5] International Journal of Scientific & Engineering Research, Volume 5, Issue 6, June-2014 216 ISSN 2229-5518. Tanimola, O. A, Diabana, P. D and Bankole, Y. O. Lagos State Polytechnic, Ikorodu, Nigeria