SOLAR GARDENBOT

Prof. Manoj Mishra, Shrutika Sawant, Shriwari Shedge, Ketaki Waikul, Sweety Vade

Department of Electronics and Telecommunication, Atharva College of Engineering, Maharashtra, India

Abstract :In this project we have studied the importance of solar energy and converted the solar energy to electrical energy in order to drive our project, We also studied the working of wireless transmission and reception with the help of HC-12 wireless module, and studied the working of 8051 microcontroller with solar panel,battery,7805 voltage regulator, push buttons,hc-12 module, mosfetswitch, motors and L293D motor driver. Thus this make our project eco friendly, less time consuming and less human efforts.

Keywords : **8051 microcontroller, Solar panel, Voltage Regulation, HC-12 wireless module, DC motors.**

I. INTRODUCTION

The world is using up all the resources to meet the daily needs of energy hence we need to use an alternative to this. Our project is based on solar energy and is a remote operated device used for grass cutting and floor cleaning. 8051 microcontroller is the backbone of our project and it controls the movement of motors and give commands for grass cutting and floor cleaning with proper coding. Hence, it reduces human efforts as well as air pollution and noise pollution as compared to traditional lawn movers.

II. LITERATURE SURVEY

NAGTODE AKASH (2017) IJSDR

The topic of his project was solar opearated floor cleaning machine that uses solar energy for floor cleaning action by using photovoltaic panel that converts photons incident on the panel to electrical energy.So this action was used in cleaning floors.

SANDEEP. J. MESHRAM ET AL (2016) IJSDR

Street cleaning machine using Tricycle, He designed a model for rural areas which works on energy generated by tricycle for the purpose of floor cleaning.

MANREET KAUR (2014) IJSDR

Auto manual floor cleaning robot, Author made a robot that can be controlled automatic as well as manually ,For the designing of robot author used following components irsensors,four motors and water pump. With the help of IR sensors obstacle detection was achieved.

Dr. J. HAMEED HUSSIAN (2017) IJSDR

Microcontroller based Floor cleaning machine. This machine is designed to clean the floors by cleang the dust away .This cleaning action is done using gear motor which is attached to the front axis and this motor is connected to 12 voltage battery and the car which is operated with the help of remote require 9 voltage supply and this car is controlled using microcontroller.

Low cost lawn mover, As we know that traditional grass cutting machine is costly as they require high maintenance as they are operated using fuel and electrical energy. For better performance the model has characteristic such as light weight, durability. The model is powered using 12V that drives DC motor as a result of torque the grass cutting mechanism is carried out. this configuration was set up on wooden frame that is attached to bicycle frame and arrangement of wheel.

BIDGAR PRAVIN DLIP (2017) IJAREEIE

Presently, manually handled device is commonly used for cutting the grass over the field which creates pollution and loss of energy. Automatic solar grass cutting system will help in reducing the efforts that are required for grass cutting in the lawns. Also, we will be using solar power to provide the driving force for the cutter and various sensors that are used for detection as well as to avoid the unnecessary objects in the field at the time of operation. It consists of a microcontroller Arduino ATmega328p, IR sensors, LCD Display for better response and understanding to the user. This paper will highlight the working principle and operation of the Automatic Grass cutter.. It is based on a microcontroller Arduino ATmega328p, LCD Display ,IR sensors for better understanding and response to the user. This paper provides the information about the working principle as well as the operating principle of Solar Grass Cutting Motor..

P.AMRUTESH (2014) IJERA

A Solar grass cutter is a energy saving machine consisting of rotating blades of particular power to cut a lawn containing grass at an required length. Every field contains even more sophisticated devices. Power consumption has become necessity of the future. Simple in construction as well as easy to operate, the Solar grass cutter is a very useful and handy device that requires a very little human intervention. It is useful in maintain as well as upkeeping the lawns in gardens, colleges , schools etc. Some changes have been made in the existing machine by us ,to make its application easier at reduced cost. Our main aim is to achieve pollution control through this. Unskilled operation can be operated easily which will help in maintaining maintain very fine and uniform surface look. In our project, Solar Grass Cutter is used to cut different types of grass .

III. METHOD USED

From the above literature survey we decided to merge two applications of Grass cutting and Floor cleaning and for that we used 8051 microcontroller ,HC-12 wireless module,L293D motor driver IC, Solarpanel. With the help of Solar panel solar rays are extracted and that energy is stored in Battery of 12 V.7805 voltage regulator is used to convert 12 V to 5V and this 5V supply is given to 8051 microcontroller which in turn control motor driver IC,grass cutting motor,pump and floor cleaning motor. Our project is operated using remote which is controlled by interfacing of 8051 microcontroller with switches,HC12 module.

IV.COMPONENTS USED

Hardware used

Solar panel-We are using 12V polycrystalline solar panel.Solar panel is use to convert solar rays to electrical energy.Solar panel generate dc electricity when solar rays incident on it due to photovoltaic effect.

Battery-Lead acid battery this battery is of 12V and it stores electrical energy of 12V from solar panel with the help of this battery we are driving our Gardenbot components.

7805 Voltage Regulator- 8051 microcontroller requires 5V but we have 12V in order to convert 12V to 5V we use 7805 voltage regulator it basically reduces the voltage from 12V to 5V.

8051 microcontroller-We are using AT89C51 microcontroller which is 8 bit microcontroller which uses less power and better performance,This microcontroller is interfaced with push buttons,Hc-12 module ,mosfet switches and motors.It has four bidirectional ports.It is a 40 pin ic.

HC-12 wireless module-This is new wireless embedded module with communication distance of 1000m ,it has frequency band433.4-473 Mhz with transmitting power of 100mW.

L293D-This is a motor driver ic which consist of two H bridge circuit and used for controlling the movement of motors either forward,backward,left or right.It acts like a current amplifier it takes low current signal and provides high current signals to motors.

Mosfet as switch-We are using three mosfet switches to control the switching of pump,grass cutting motor and floor cleaning motor.mosfet is three terminal device with gate, source and drain.We are using irf 540N .

Dc Motors-This project uses four 20rpm motors which is controlled by L293D ic for forward,backward,left,right movement, uses one 18000rpm motor for grass cutting and one60rpm motor for floor cleaning. The mechanism of grass cutting and floor cleaning completely depends on speed of motors.

Pump-This project uses 3-6V pump,.pump will suck water and then it release water with the help of pipe this action is controlled by 8051 microcontroller via mosfet switch

Software used

Keil u vision –We have used Keil software for 8051 programming for interfacing 8051 microcontroller with HC-12 wireless module,motor driver ic,switches,motors.

Proteus Software-We have used Proteus Software for pcb etching ,drawing circuit diagram and 3d layout.
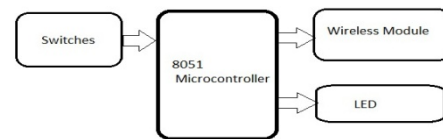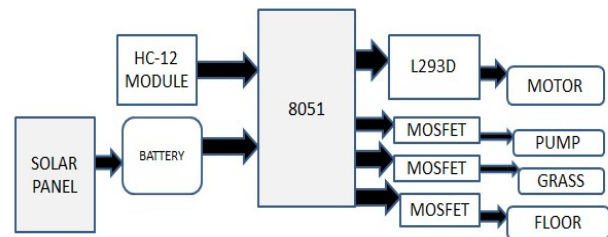
V.BLOCK DIAGRAM

Fig. 1 Transmitter Block diagram

Fig. 2 Receiver Block diagram

VI.WORKING

Remote working-We are using 8051 microcontroller which will be interfaced with hc-12 wireless module ,switches and leds.7805 voltage regulator is use to convert voltage from 12v to 5v which will be given to 8051uC to power the controller. We are using push buttons for left, right,forward and backward movement which is control by 8051 programming. And we use slide switch for on/off action of grass cutter, floor cleaner and pump.This actions will be transmitted by hc-12 module to the receiving project model.

Project model working-The signals transmitted by remote is received by hc-12 module on receiver side and depending on the input given we get desiedoutput.If input is for grass cutting then grass cutting motor will start via mosfet switching which is programmed using 8051 micro controller and same actions are carried for floor cleaning and pump.onreceiver side consists of L293D motor driving icfor

controlling the movement of motors ,ic is interfaced to 8051uC.Programming of 8051 microcontroller is done using Keil Software.

VII.ADVANTAGES

- Eco Friendly
- Less human efforts
- Portable
- Multitasking

VIII.CONCLUSION

Thus we have implemented solar gardenbot which is durable,ecofriendly,lessmaintainance and portable.It is a multipurpose machine that does not require fuel.

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