

AUTOMATIC FARMING SYSTEM

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Abstract

Since Olden times man has been cultivating and depending heavily on the plant and crops to arrange for the staple food. To do this he had to toil and severe with labor. As the technology advances people wish for more and more comfort, reliability and fast operation. India is the farmer's country and major part of the revenue is generated out of the agriculture industry Keeping the above ideology in mind this project propose to design a unit with following features:1.ploughing 2.seedsowing 3.cutting etc. This study develop an Energy Saving Automatic Farming System with two unit User unit (remote control) & Solar Powered Tractor Unit. From user unit i.e. Wireless remote it gives instruction to the tractor unit to perform various task such as plugging, seed sowing, cutting etc The required power supply for performing various task is obtained from solar panel using tracking and trapping system to obtain maximum solar energy. For automation of tractor unit it uses memory mapping which will be performed by microcontroller in embedded c using Kiel software.

I. INTRODUCTION

The conventional sources of energies are limited & are nonrenewable source. Looking at today's use of energy, these sources are not going to last for more than 30 years from now. What will the world do, after these sources are exhausted? The ultimate source of energy then will be non-conventional sources of energy. These sources are renewable type. As much as you use, it will always remain. Sun will never stop rising/ shinning. In the twenty-first century, consumption of energy has increased on account of technological progress and population explosion. Hence scientist began to express the fear that deposits of conventional fuels would be depleted in the near future the possibility of the exhaustion of the sources of fuels is known as the 'energy crises. The average solar energy radiated on earth is 1.36 kWh (kilowatt hour) per square meter. This energy is equal to the energy that can be obtained from 12 lakh crore tons of coal & is 20 times the amount of energy that can be obtained from the total coal deposits available on the Earth So this project "automatic farming system" which will harness the solar energy and will be use for agriculture purpose in a unique and innovative way.

A. What is Robot?

A robot can be defined as a reprogrammable, multifunctional manipulator which is designed to move material, parts, tools, or specialized devices through various programmed motions to perform a variety of tasks.

B. Features of Project:

The designed solar powered tractor has following features:

1. It has tools for performing various agricultural tasks like
 - cutting
 - plugging
 - seeding etc
2. This posses a solar panel for saving diesel & petrol cost.
3. Tractor has memory in which it will store information about tracks, fields, etc.
4. We can add Wireless camera & GPS module for video surveillance & positioning. (optional)

II. BLOCK DIAGRAM

The block diagram of the project is mainly divided into two sections:

- User Unit (RF transmitter to control tractor.)
- Tractor Unit (RF receiver on tractor and solar trapping system).

A. Solar powered Robotic Tractor:

- The tractor has various mechanical tools for performing different agricultural task like seeding, cutting, plugging etc.
- The tractor is also equipped with various sensors to detect & avoid obstacle, fire etc.
- The operation of tractor is control via wireless remote provided with user.
- Tractor will use inbuilt memory to store track information, field information etc.

B. Wireless remote to control Robotic tractor

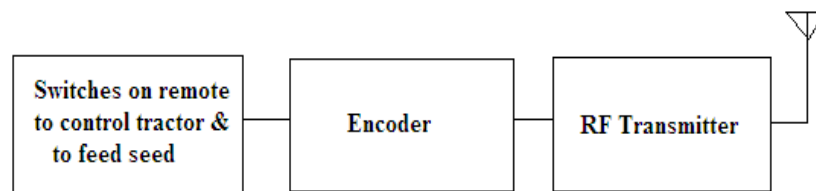


Fig.1

The transmitter used here is to control the tractor from a distant place. The data send from the switches is in parallel form and the transmitter module accepts the data in serial form. The Encoder will convert the parallel data to serial data and data will be given to transmitter.

C. Robotic Tractor with solar trapping system

The receiver module here will receive the wireless data send by the transmitter. The decoder will convert the serial data from module into parallel data. These parallel data is given to the motor driver to control the motor for navigation purpose and seed feeder.

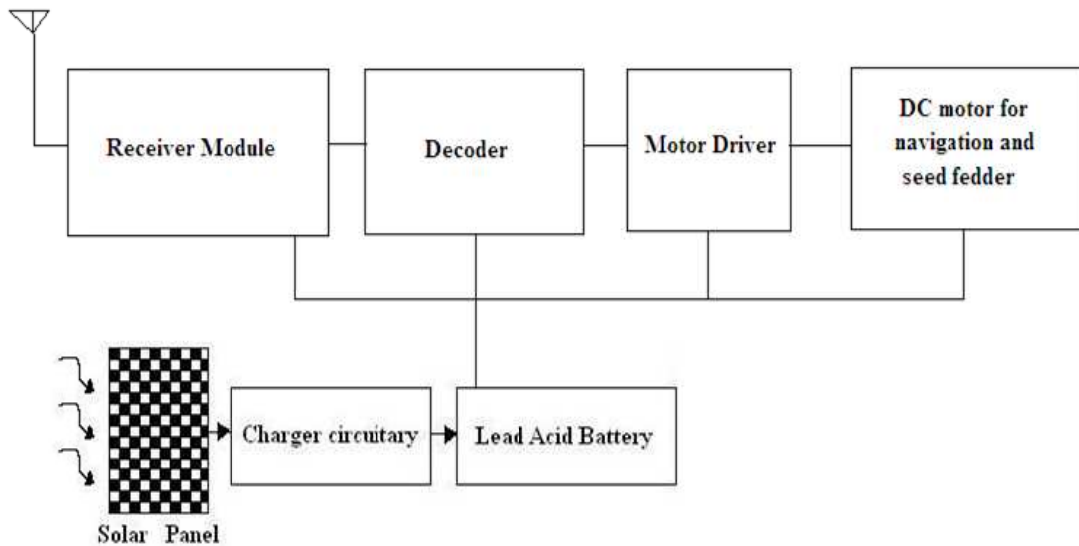


Fig.2

The circuit and the motors will be powered by the lead acid battery which interns get charged by the solar panel mounted on the tractor.

III. WORKING OF PROJECT

1. User i.e. Farmer has a remote on which there are many switches for controlling robot.
2. The robot /tractor uses solar panel for generating electricity & o/p of solar panel is connected to a battery .so in the day time the solar panel will charge battery & during night time the tractor takes power from battery. So it provides battery backup also.
3. Now tractor is having many tools for performing various agricultural task like cutting, seeding, plugging etc
4. User can control all the task of robot via wireless RF tx rx pair.
5. The robot also has obstacle detection & avoiding facility to avoid any obstacle if coming in the route of tractor.
6. In this way freely available solar power minimizes use of diesel & petrol doing automation in agricultural system.

A. How Solar Cells Work

Photovoltaic Cells: Converting Photons to Electrons

The solar cells that you see on calculators and satellites are also called photovoltaic (PV) cells, which as the name implies (photo means "light" and voltaic means electricity.) converts sun light directly into electricity A module is a group of cells connected electrically and packaged into a frame (more commonly known as a solar panel), which can then be grouped into larger solar arrays.

Photovoltaic cells are made of special materials called semiconductors such as silicon, which is currently used most commonly. Basically, when light strikes the cell, a certain portion of it is absorbed within the semiconductor material. This means that the energy of the absorbed light is

transferred to the semiconductor. The energy knocks electrons loose, allowing them to flow freely. PV cells also all have one or more electric field that acts to force electrons freed by light absorption to flow in a certain direction. This flow of electrons is a current, and by placing metal contacts on the top and bottom of the PV cell, you can draw that current off for external use, say, to power a calculator. This current, together with the cell's voltage (which is a result of its built-in electric field or fields), defines the power (or wattage) that the solar cell can produce.

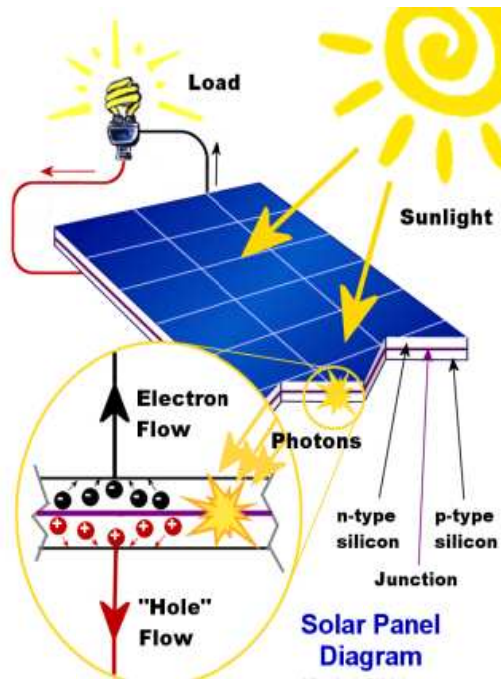
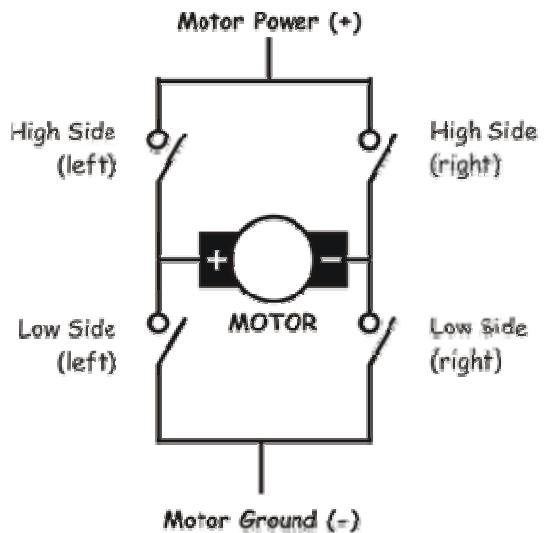


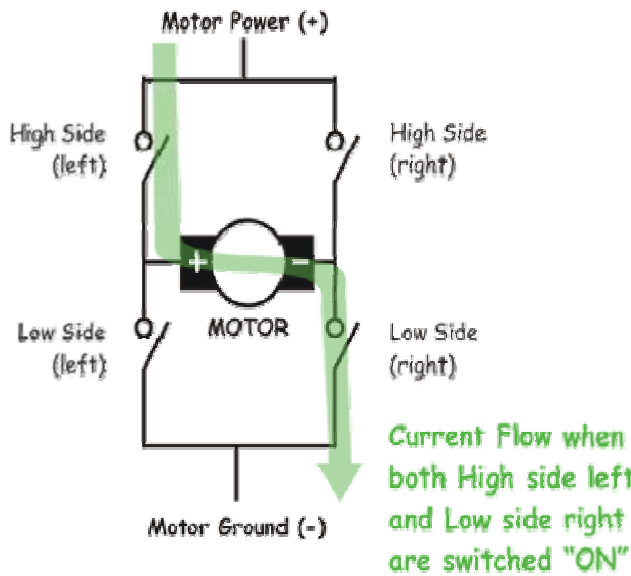
Fig 3 Working of solar panel and solar cell

B. Basic Theory

H-bridge sometimes called as "full bridge" the H-bridge is so named because it has four switching elements at the "corners" of the H and the motor forms the cross bar. The basic bridge is shown in the figure to the above. The key fact to note is that there are, in theory, four switching elements within the bridge. These four elements are often called, high side left, high side right, low side right, and low side left (when traversing in clockwise order). The switches are turned on in pairs, either high left and lower right, or lower Left and high right, but never both switches on the same "side" of the bridge. If both switches on one side of a bridge are turned on it creates a short circuit between the battery plus and



battery minus terminals. This phenomenon is called shoot through in the Switch-Mode Power Supply (SMPS) literature. If the bridge is sufficiently powerful it will absorb that load and your batteries will simply drain quickly. Usually however the switches in question melt.



To power the motor, you turn on two switches that are diagonally opposed. In the picture to the right, imagine that the high side left and low side right switches are turned on. The current flow is shown in green.

The current flows and the motor begins to turn in a "positive" direction, current flows the other direction through the motor and the motor turns in the opposite direction. Actually

it is just that simple, the tricky part comes in when you decide what to use for switches. Anything that can carry a current will work, from four SPST switches, one DPDT switch,

relays, transistors, to enhancement mode power MOSFET. One more topic in the basic theory section, quadrants. If each switch can be controlled independently then you can do some interesting things with the bridge, some folks call such a bridge a "four quadrant device". If you built it out of a single DPDT relay, you can really only control forward or reverse. You can build a small truth table that tells you for each of the switch's states, what the bridge will do. As each switch has one of two states, and there are four switches, there are 16 possible states. However, since any state that turns both switches on one side on is "bad" (smoke issues forth), there are in fact only four useful states (the four quadrants) where the transistors are turned on.

High Side Left	High Side Right	Lower Left	Lower Right	Quadrant Description
On	Off	Off	On	Motor goes Clockwise
Off	On	On	Off	Motor goes Counter-clockwise
On	On	Off	Off	Motor "brakes" and decelerates
Off	Off	On	On	Motor "brakes" and

IV. APPLICATIONS

The applications of these robots are:

1. Mars exploration robot was autonomous solar powered robot.
2. This principle can be used in day to day life in cars and automobiles.
3. Apart from the robot solar tracking and tracing can be used in industries, for home use.

V. ADVANTAGES

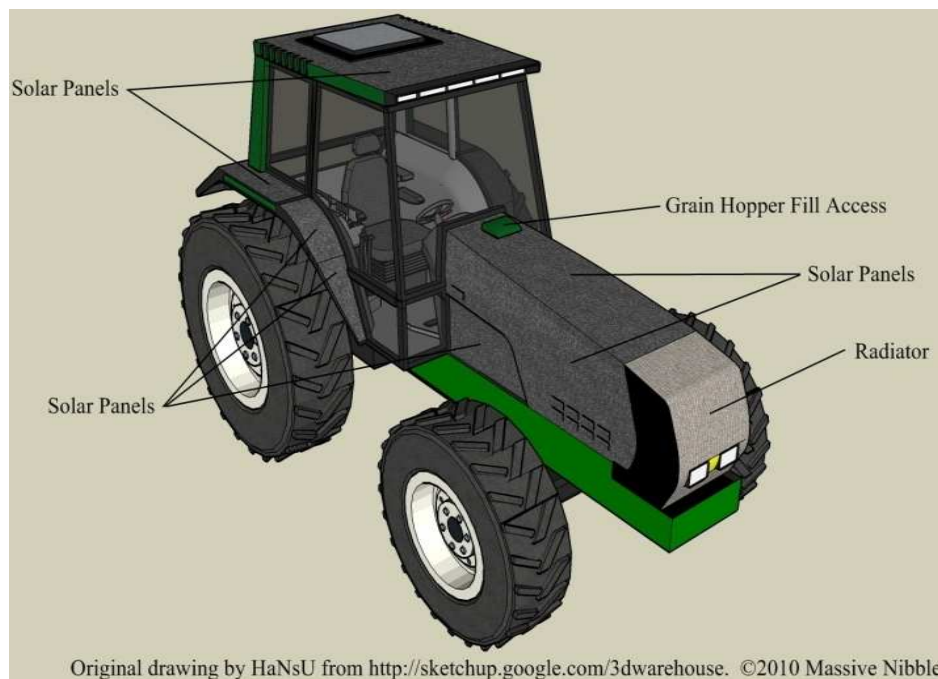
1. No fuel required as the robot is battery powered.
2. No external charging of battery is required as charging is done by the solar panel placed on the robot.
3. The tracking trapping of solar energy can be used for home appliances.

VI. FUTURE SCOPE

In future we will try to improve this project & try to implement a trolley also. So this will fulfill complete kit for a former. Also we will try to make it more intelligent & autonomous.

VII. CONCLUSION

This paper proposed an idea of automatic farming system lucrative advancement in the field of technology. The project we implemented, reduces man power and saves the conventional energy sources by performing various tasks of farming automatically & helps a farmer in his day to day work performing rapidly & effectively with the help of this system.



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