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An Empirical Study for Solar Sunflower

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Abstract: All of the life that is on the earth can survive because of the sun. Every day, the energy given from the sun's rays sustains life. It provides us with heat, light, health benefits and various other applications, like the widely used and known solar energy. Without the sun, the earth would be just a ball of rock without any life forms. The importance of solar energy in our daily life is more significant than any other thing in your life — besides water and food. Solar energy has been growing as a renewable and alternative energy source. That's why it's necessary to understand the importance of the sun's power because, if you don't already, you could very well be reliant on the sun for your daily energy needs. So keeping that though in mind and to attribute to the Mission-ATMA Nirbhar bharat we have presented SOLAR SUNFLOWER system which is working of solar tracker and to design the same. Solar panel has been used increasingly in recent years to convert solar energy to electrical energy. The panels can be utilized either as a large solar system that is connected to the electricity grids or as a stand-alone system.We are trying to munch additional energy from the sun via solar panel. In order to maximize the conversion from solar to electrical energy, the solar panels need to be placed at right angle to the sun. Thus the tracing of the sun's position and positioning of the solar panels is a significant task. The goal of this project is to make an automatic tracing system, which can trace location of the sun. The tracing device will move the solar panel so that it is positioned perpendicular to the sun for maximum energy conversion at all time. LDR's are used as sensors in this system. The system will consist of light sensing system, microcontroller, gear motor system, and a solar panel. Our system will output up to 30% more energy than solar panels without tracking systems.

Keywords: Solar pannel , LDR, Microcontroller, battery,Gear Box

I. INTRODUCTION

Now a day's renewable energy solutions that is collected from renewable resources are becoming popular. Among them, one of the abundant sources is solar energy. For the past years, this application is used in household, industries, schools, colleges etc. Solar system has good efficiency and maximum output. In recent days solar panels are of fixed type, which have lower efficiency than movable type. A solar tracker follower is a gadget utilized for arranging a sun powered photovoltaic board or focal point towards the sun by utilizing the sunlight based or light-based sensors associated with the machine. The advantage of solar energy is that it is unlimited and pollution-free. The only way to increase the solar energy is to arrange the panel perpendicular to the sun. Solar tracking or sunflower is the best method, by following the sun and rearrange the solar panels perpendicular to solar irradiation gives higher efficiency. It is a photovoltaic (PV) system that has been incorporated to bring visibility to solar technology, and at the same time to enhance the landscape and architecture they complement via aesthetics. Smart flowers have been modeled like a sunflower, and they have all the individual components, including solar panels, inverters, wiring, batteries, and others to generate electricity and store it.Besides generating solar energy, another objective of installing smart flower is to create public awareness and increase the adoption of renewable energy. Photovoltaic systems like smart flowers are not typical primary sources of energy for a property, which is fulfilled by traditional rooftop solar panels. Solar flowers work as complementary to rooftop solar systems or various other green building techniques, and symbolizing the environmental benefits of renewable energy.

II. PRAPOSED METHODOLOGY

Solar power is most ubbdant resource accessible from scenery. So it is our most prominent duty to covert that available source into Electricity. So that we can give back to earth in form of polution free and carbon free enviornment. So we have design a rotating sun flower in which solar plate are open up in the morning and close up in the evening. And rotate the solar plate in the direction of sun, so that maximum energy can be converted to electricity. So to execute the work we have used different componant like LDR,Microcontroller and solar pannel and battery house.

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III. HARWARE ACCOMPLISHMENT AND WORKING

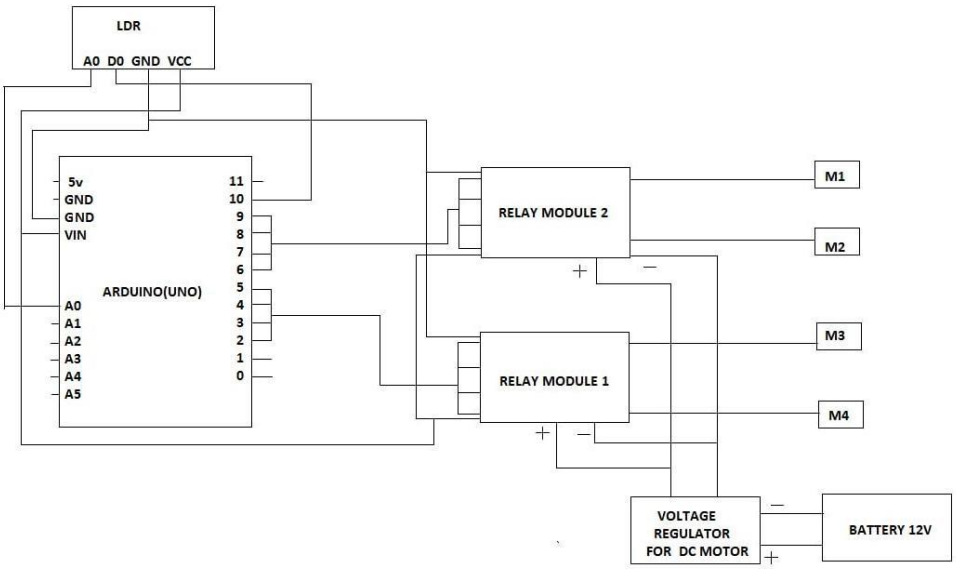

Fig. 1 Block diagram of Solar Sun flower

The working code of the solar sunflower is same as the rooftop solar panel but the divergence is occure interm of design aspect. The solar panel is intend in such a manner that it can open and close like flower gets bloom.We have bloom the solar panel in such a way that when light spray on panel it will open and when there is dark we can say no sunlight then it will close or we can it will shrink.We have already programmed in the arduinouno and relay, motors and solar panels are connected. So when we plug the adapter and turn ON the button then arduino will turn ON and the program will be operate and the motor will rotate anticlockwise.All the 4 motors are operated in the anticlockwise direction but it will operate slowly and all the 4 motor have a different time so that the solar panel will come one upon the other otherwise the solar panel will not operate and give the output.So while programming we have given a definite interval of time to all the 4 motors to operate. The solar panel are mounted on all the 4 motors and according to that the solar panel will open and close.We can also control the speed of the motor by PWM speed controller but according to that we also have to change the programming we just have to change the time interval. The programming is so simple and easy.So this is how the solar sunflower operate when the sunlight is falling on it but when the night comes there will be darkness at that time the solar panel will be close according to that and the load will not get supply so we can charge the battery and also operate it .

IV. TECHNOLOGY APPLIED

A. Arduino UNO

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging 2.1mm centre-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector. The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.

B. LDR

Light Dependent Resistor is made of a high-resistance semiconductor. It can also be referred to as a photoconductor. If light falling on the device is of the high enough frequency, the absorbed photons by the semiconductor gives bound electrons sufficient energy to jump into the conduction band. The resulting free electron conducts electricity, thereby lowering resistance. Hence, Light Dependent Resistors is very useful in light sensor circuits. LDR is very high resistance, sometimes as high as 10M, when they are illuminated with dramatically fall in light resistance. A LDR is a

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resistor that changes in value according to the light falling on it. A commonly used device, the ORP-12, has a huge resistance in the dark, and a small resistance in the light. Connecting the LDR to the microcontroller is very straight forward, but some software calibrating is required. As we know, the LDR response is non-linear, and so the readings will not fluctuate in precisely the same way as with a potentiometer. In general there is a larger resistance change at brighter light levels. This can be compensated for in the software by utilizing a lower range at darker light levels.

C. Relay

The four-channel relay module contains four 5V relays and the associated switching and isolatingcomponents, which makes interfacing with a microcontroller or sensor easy with minimum componentsand connections. The contacts on each relay are specified for 250VAC and 30VDC and 10A in each case,as marked on the body of the relays.

D. Solar Panel

This solar panel is made of single-crystal material that performs high solar energy transformation efficiency at 25%. It has a fine resin surface and sturdy back suitable for outdoor environments. A 2mm JST connecter is attached to the penal, which makes it perfect to team up with most of our can-use-solar-power-supply boards, like Seeeduino microcontroller series,Lipo Rider charging boards seriesandXBee carrier WSN products series. The typical open circuit voltage is around 5V, depending on light intensity. In those bright summer days with clear sky and big sun, the peak OC voltage can rush up to 10V. To prevent any damage to boards that accept a narrow range of input voltage, like Lipo Rider, its recommended to check whether the OC voltage is safe before any connection.

V. HARDWARE IMPLEMENTATION

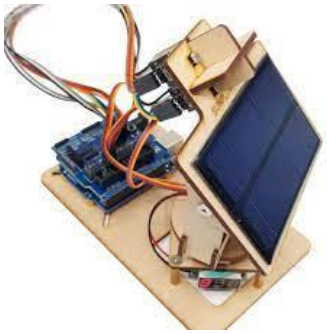

Fig. 2 Hardware implemenatation

VI. ADVANTAGES

- Low cost/simple
- Easy to operate – reliable
- End-to-end connectivity and affordability
- Notification and alert
- Easy to Install

VII. CONCLUSION

Here we have presented efficient method to convert the maximum solar energy to Electricity-Solar Sunflower. It will open and close the pannel according to sun light. Converted Engery is stored in the battery. So praposed technology defently helps to creat solar transformation in filed of renovable energy conversion.

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