

## “DUAL AXIS SOLAR TRACKER WITH MPPT CHARGE CONTROLLER”

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### ABSTRACT

As the energy demand and the environmental problems increase, the natural energy sources have become very important as an alternative to the conventional energy sources. The renewable energy sector is fast gaining ground as a new growth area for numerous countries with the vast potential it presents environmentally and economically. Solar energy plays an important role as a primary source of energy, especially for rural area. This paper aims at the development of process to track the sun and attain maximum efficiency using Arduino Uno and Lab VIEW for real time monitoring. The project is divided into two stages, which are hardware and software development. In hardware development, four light dependent resistor (LDR) has been used for capturing maximum light source. Two DC motors have been used to move the solar panel at maximum light source location sensing by LDR. The GUI is constructed by using Lab VIEW. The performance of the system has been tested and compared with static solar panel. This paper describes the design of a low cost, solar tracking system.

### KEYWORDS

3D LED CUBE,

### INTRODUCTION

Position of sun not only change from morning to evening but also, varies with season. To trap maximum energy, an arrangement is required so that solar radiation falls on the panel at an angle of 90 degree throughout the day. We use Maximum Power Point Tracking (MPPT) to trap the maximum solar energy from the solar plate. 4 Light Dependent Resistors (LDR) are used to capture sun radiation and LDRs give the signal to motor driver to rotate horizontal as well as vertical motor, which can move system up – down and also right – left.

### PROBLEM IDENTIFICATION

Solar trackers have both horizontal as well as vertical axis tracking. A controller is used for multiple sensors to follow the movement of the sun. After the battery is fully charged through the charge controller, it needs to be disconnected to avoid overcharge. For the need of electricity in rainy season, more battery will have to be add.

### Aim and objective

A model has been developed using a 4 volt solar panel for MPPT. Four LDRs are used to sense the direction of solar radiation and the required angle of vertical and horizontal rotation is calculated and accordingly micro-controller sends the signal to the servo motor for appropriate angle of rotation.

### COMPONENT

1. LDR module - The digital ldr module is used to detect the presence of light / measuring the intensity of light. The output of the module goes high in the presence of light and it becomes low in the absence of light. The sensitivity of the signal detection can be adjusted using the potentiometer.
2. Arduino Uno R3 - The Arduino Uno Rev3 SMD is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator , a USB connection, a power jack, an ICSP header, and a reset button.
3. L298n Motor driver - The L298N is a dual H-Bridge motor driver which allows speed and direction control of two DC motors at the same time. The module can drive DC motors that have voltages between 5 and 35V, with a peak current up to 2A. Let's take a closer look at the pin out of L298N module and explain how it works
4. MPPT charge controller - An MPPT, or maximum power point tracker is an electronic DC to DC converter that optimizes the match between the solar array (PV panels), and the battery bank or utility grid.



Snap Shot

## REFERENCES

- [1] Chao – Huang Wei and Phuong –Nhung Bui “Implementing a web based remote controlled system for Led dot matrix display”.
- [2] **Anurag Singh et al., (2015)** “Three Dimensional Cubic Display and Lattice Analysis Using 89C51 Microcontroller”. Published in International Journal of Engineering Research & Management Technology , ISSN: 2348-4039.

## Web Sites

- [3] A demonstration of LED cube  
<http://www.youtube.com/watch?v=6mXM-oGggrM>  
Guide on making LED cube  
<http://www.instructables.com/id/Led-Cube-8x8x8/?ALLSTEPS>.