

# SOLAR PANEL TRACKING USING MPPTTECHNIQUE

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## ***ABSTRACT***

The need for renewable energy sources is on the rise because of the acute energycrisis in the world today. India plans to produce 63.303 Gigawatts Solar power by the year 2022. Solar energy is a vital untapped resource in a tropical country like ours. The main hindrance for the penetration and reach of solar PV systems is their low efficiencyand high capital cost. In this is, we examine a schematic to extract maximum obtainable solar power from a PV module and use the energy for a DC application. This project investigates in detail the concept of Maximum Power Point Tracking (MPPT) which significantly increases the efficiency of the solar photovoltaic system.

The tracking system will move the solar panel so that it is positioned perpendicular to the sun for maximum energy conversion at all time. Photo resistors willbe used as sensors in this system. The system will consist of light sensing system LDR, Arduino developed board, gear motor system, and a 10W solar panel. Our system will output up to 40% more energy than solar panels without tracking systems.

Is device which is the integration of smaller mechanical components specifically designed to generate higher efficiency in solar energy with respect to other solar energy devices such as solar panels, dry cells etc. it approximately tracks 30 to 40%of solar energy more than fixed solar devices. So, we can utilize the maximum power thatcan be generated by the solar panel. Most solar panels are made up using crystalline silicon solar cells. Installation of solar panels in homes helps in combating the harmful emissions ofgreenhouse gases and thus helps reduce global warming. Solar panels do not lead to anyform of pollution and are clean. They also decrease our reliance on fossil fuels (which are limited) and traditional power sources. These days, solar panels are used in wide- ranging electronic equipment's like calculators, which work as long as sunlight is available. However, the only major drawback of solar panels is that they are quite costly. Also, solar panels are installed outdoors as they need sunlight to get charged

## I. INTRODUCTION

Bustling civilization is the vein through which modern civilization is operated. Energy day by day is put to use at its best to fulfill the desires and ambition of the peoples at large. Each and every corner of our life is caged with various layers of impediment and in this response, energy is becoming an indispensable factor. Therefore, the source of energy needs to be endless/perpetual in order to carry this colossal population ahead. Human beings being evolutionary in nature are perhaps the best ever creation of nature is always in the race of envisaging the probable and available comforts and benefits in every possible angle in this perilous world. The evidential matrix manifests that in a dichotomy of various opinions what options best expedite the scarcity of energy in an immensely heterogeneous society like ours. Our motto is to Endeavour in forwarding such noble goal of energy conservation.

Looking at the present scenario it is evident that conventional sources of energy such as coal, natural gas, oil, etc. are at the edge of extinction. Being in mortal combat with time itself to fulfill every demand for energy the demand for these resources for energy has escalated to its zenith. The conventional use of energies due to the burning of fossil fuels like coal, oil and natural gas, the whole environment is getting polluted. The present project, therefore, is orchestrated with components like ldr module, dc motor, Photovoltaic array etc. according to which while the functioning of, unlike other use of the conventional energies, would not emit any pollution and in turn act as a reservoir of energy taken from the Sun itself. As adumbrated no other energy is more abundant than solar energy as per as its availability and freeness are concerned, utilization of which, compounded with rest of the fact of its conversion into electrical energy. Historically if counted, in the year 1881 for the first time ever solar panel was invented. Later on, all through the hands of Russell Ohl in the year, 1941 concept of the solar cell was conceived and subsequently workability of a solar panel has also advanced in comparison with the earlier span. though it is improbable still it is not impossible as per as tracking of the mother energy is concerned in furtherance to which attempt has been taken through this project to confine every drop of energy from being left out. the dc motor adjacent with the system with the help of ldr module by introduction 2 aerie, receipt measuring the intensity of the sun rays fixed on the upper edge of the solar panel will help the solar panel to revolve around proportionately with the movement of the sun itself in order to grab and store the maximum amount of energy as it can. in pursuance of such objectivity, this project comes forth into existence.

when heat is the source of every creation, sun produces the biggest ever energy in this solar system to produce and transcend life from one organism to the other. In this response, the project called "solar panel tracking using MPPT technique" serves the purpose of utilizing the maximum amount of energy taken from the sun and to convert such energy into some other production. The basic endeavour is crowned to scoop out from this project in making this system an economically convenient subject, accessibility of which is easy and functioning of which is optimum in the end. In the wake of technological advancement when the pace of time is at its best to pass by, this system is a time worthy production, produced to create the best of its kind. In a stretch, it could be signified that this project which is an extension of solar energy, is a renewable source of energy, never-ending phenomena. It's only 10 to 20 per cent of the solar cells that are being used commercially out of which the best potential of the cells gets reflected and therefore scope for better use of the solar cells exist. In the world of pollution, this system is an eco-friendly alternative, hence an asset.

### **CIRCUIT ANALYSIS**

According to the block diagram the first block is light sensing device which is known as LDR, light sensing device used to track the magnitude of light source by offering the large resistance in low light condition, and low approx 0 resistance in high lightings

The demo module is constructed with 10W lamp loads powered through switches from mains supply source. The intention of using load is that, we can utilize the generated power in necessary situation from the batteries.

We can see in our project we have 10W solar panel, Arduino board, L293D H-bridge IC, SG2534N push pull inverter IC & a servo motor. Most solar panels are made up using crystalline silicon solar cells. Installation of solar panels in homes helps in combating the harmful emissions of greenhouse gases and thus helps reduce global warming. Solar panels do not lead to any form of pollution and are clean. They also decrease our reliance on fossil fuels (which are limited) and traditional power sources. These days, solar panels are used in wide-ranging electronic equipments like calculators, which work as long as sunlight is available. However, the only major drawback of solar panels is that they are quite costly. Also, solar panels are installed outdoors as they need sunlight to get charged. H-bridge drive is used to rotate the DC motor in both forward and backward directions. Inverter is used to convert DC power to AC power (square pulse) and that AC power is fed to 20W transformer where the voltage raises from 12V to 230V it supplies to 10W lamp

## CIRCUIT DIAGRAM

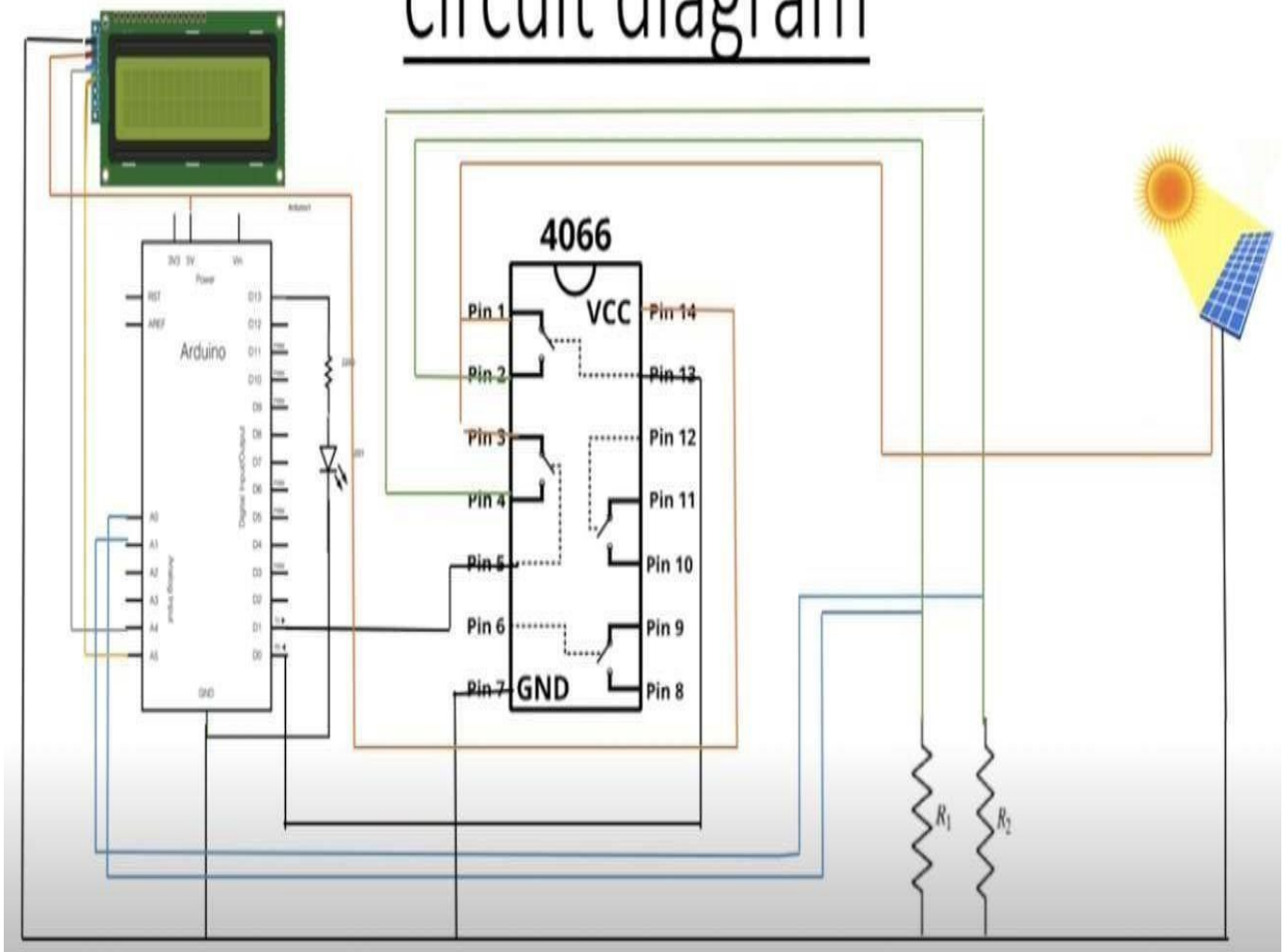
circuit diagram

Fig 1: Fault detection in 3 phase transmission line

Sunlight is composed of photons containing energy which correspond to the different wavelengths of the solar spectrum. When photons strike a PV cell, their energy is transferred to an electron in the semiconductor material of the cell. With this extra energy, the electron is then able to escape from its normal position in the atom creating a "hole", which will become part of a current in an electrical circuit.

A diode is formed when two layers of semiconductor materials are doped so that one will conduct negative carriers and the other positive carriers. When photons fall on these layers, they transfer energy and momentum to charge carriers, which increase their potential energy by an amount depending on the diode's material properties. Because of their electrical properties, PV modules produce direct current (DC) rather than alternating current (AC). In the simplest PV systems, DC current is used immediately in applications but where AC is required; an inverter is added to the system to convert DC into AC

The efficiency of the photovoltaic conversion process would be about 85% if each photon could transfer all its energy into that of charge carriers. However, this is normally not the case as any transfer of energy from photon to charge carrier can only be of the amount given by the band-gap of the semiconductor material. Photons with energies below the energy band-gap of the material are lost from the photovoltaic effect and converted into heat. In addition, photons with energies above the band-gap transfer no more than the band-gap energy, and any excess energy is lost. In today's cells, both of these effects individually limit the theoretical efficiency to 50%. Currently, practical maximum efficiencies are in the range of 15-20%. Ideally, PV cells would consist of material layers with different band-gaps, for each photon to be absorbed exactly where its energy matches the band-gap energy

The output from a PV module depends on the amount of incident light and other factors such as temperature and the cleanliness of the cell surface. Modules are rated in terms of their peak output (Peak Watts, or WP), which is the maximum power that they will produce given calibrated solar input and operating conditions. However, PV cells can produce useful quantities of power in less-than-ideal solar conditions.

## II. CONCLUSION

The project work “solar panel tracking using mppt technique” is completed successfully, results are found to be satisfactory. Since it is a prototype module.

A solar tracker positions the solar panel at an angle directed to sun. It is an advanced sun monitoring system that can rotate the panel track the movement sun across the sky. It facilitates the panel system to trap the maximum sun light and optimize the energy output there are considerable advantages to using a solar energy tracker. Tracking systems provide highest benefits for installation in high latitude locations. Because of yearly movement of sun. Also, solar trackers can be highly advantageous, depending on the climate conditions and locations of the installation.

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