Volume 8, No. 4, May 2017 (Special Issue)
ISSN No. 0976-5697
International Journal of Advanced Research in Computer Science
REVIEW ARTICLE
Available Online at www.ijarcs.info

Design and Performance of Solar Tracking Photo-Voltaic System using Microcontroller

Zahoor Ahmad
Assistant Professor
Department of Electrical Engineering
Islamic unicersity of Science & Technology
Awantipora, J&K India
zahoor.rifi@gmail.com

Suraya Sharief
Assistant Professor
Department of Electrical Engineering
Islamic unicersity of Science & Technology
Awantipora, J&K India
suriyasma786@gmail.com

Abstract —**Solar power generation had been employed as a renewable energy for years ago. Residents that use solar power as their alternative power supply will bring benefits to them The main objective of this paper is to develop a microcontroller-based solar panel tracking system which will keep the solar panels aligned with the Sun in order to maximize in harvesting solar power without unnecessary consumption of motor energy.[1] In an ordinary solar power system the sunlight was not used to the maximum extent and so in order to take the system to the highest potential, solar tracking system was employed. This paper shows design and realization of automatic solar panel orientation system in order to achieve high performances. This can be done by keeping the solar panel at 90 degree to the sun rays. To achieve this, components like PIC microcontroller, a DC gear motor, solar panel, and a gear wheel arrangement were used. The solar tracking system operates by the comparison of voltages using solar cell array, which is connected to the PIC microcontroller. And so, the main panel rotates where the maximum light is absorbed. As a result of using this solar tracking system, the efficiency of the system was found to be increasing when compared to the system that does not use the process of solar tracking.[2]**

Keywords — **Solar Tracking, Solar Panel, Microcontroller, DC Gear Motor, Sensors.**

I. INTRODUCTION

The solar energy is known to be one of the preferred renewable green energies, which is much cleaner and free from harmful production to the environment compared with the conventional counterparts [1, 2]. Maximizing power output from a solar system is desirable to increase efficiency. In order to maximize power output from the solar panels, one need is to keep the panels aligned with the sun, means that the tracking of the sun is required [3]. Solar trackers are the most appropriate and proven technology to increase the efficiency of solar panels through keeping the panels aligned with the sun's position. Solar trackers get popularized around the world in recent days to harness solar energy in most efficient way [4, 5].The main objective of this paper is to design the sun tracking solar system model which is a device that follow the movement of the Sun regardless of motor speed. In this project we can also implement an energy efficient method to control the Light Emitting Diode (LED) street lights.

Besides that, it is to improve the overall electricity generation using single axis sun tracking system and also to provide the design for residential use.

In last ten years, many of residentials around the world used electric solar system as a sub power at their houses.This is because solar energy is an unlimited energy resource, set to become increasingly important in the longer term, for providing electricity and heat energy to the user. Solar energy also has the potential to be the major energy supply in the future. Solar tracker is an automated solar panel that actually follows the Sun to increase the power [8]. The sun's position in the sky varies both with equipment over any fixed position. One well-known type of solar tracker is the heliostat, a movable mirror that reflects the moving sun to a fixed location, but many other approaches are used as well. Active trackers use motors and gear trains to direct the tracker as commanded by a controller responding to the solar direction. The solar tracker can be used for several applications such as solar cells, solar day-lighting system and solar thermal arrays [6]. The solar tracker is very useful for device that needs more sunlight for higher efficiency such as solar cell. Many of the solar panels had been positioned on a fixed surface such as a roof. As sun is a moving object, this approach is not the best method. One of the solutions is to actively track the sun using a sun tracking device to move the solar panel to follow the Sun. With the Sun always facing the panel, the maximum energy can be absorbed, as the panel is operating at their greatest efficiency [9]. The main reason for this project is to get the maximum efficiency for the solar cells. Although there are many solar trackers in the market, the price is expensive and unaffordable because the market for solar tracker is still new and only certain countries use the solar tracker such as USA and South Korea. The large scale solar tracker that normally used is not suitable for the residential use. As a result, this project will develop a Sun tracking system specially designed for residential use for a low cost solar cell. Previous researchers [10,12] and [11] used LDR and photodiode as sensors respectively. Meanwhile [10] and [6,7] used DC motor with gear and steeper motor respectively. Those projects have disadvantages and some of the disadvantages are high cost during development, difficult to control motor speed and difficult to design because using microprocessor. The main objective for this project is to develop the sun tracking solar system model which is a device that follow the movement of the Sun regardless of motor speed. Besides that, it is to improve the overall electricity generation using single axis sun tracking

CONFERENCE PAPERS
National Conference on Emerging Trends on Engineering & Technology (ETET-2017)
On 21st April 2017
University Inst. of Engg. & Tech. & University Inst. of Computer, SBBS University, Punjab (India)