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A Hybrid Technology Based Continous Monitoring and MPPT Tracking System of PV Cell Parameters using SCADA

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Abstract — To set up a multi axis solar energy harvesting system to track the motion of the sun across the sky to maximize power output is the major aim of the project. Since the position of the sun is not constant, the intensity of light falling over the arrays also varies depending upon the incident angle. Our aim is to optimize the system for maximum output power. The solution is to track the sun movement for harvesting maximum sunlight to generate power. This project helps for power generation by setting the equipment to get maximum sunlight automatically. This system is tracking for maximum intensity of light. A power motor is used which gives full freedom of rotation in two dimensions. When there is decrease in intensity of light, this system automatically changes its direction to get maximum intensity of light based on LDR network. Here we are using two sensors (LDR) in two directions to sense the direction of maximum intensity of light.

Keywords— LDR,Maximum Power Point Tracking,Solar dual axis tracking,Hybrid technology

I. INTRODUCTION

Electricity power plays major role in our day to life. The modern power generation schemes are focused towards harvesting the energy from renewable sources. Solar system is the most popular and wide generation of free electricity from sun light. The angle of the solar installation is stationary one. But the angle and axis of the sun is vary from morning to evening due to earth rotation. So that the output of the solar system is less efficiency.

The solar array generates the maximum power when the light intensity of the sun is perpendicular to solar array. Here we introduce a new hybrid technology (sensor + embedded) for generating the maximum output from PV array based on sun tracking system. The output of the solar system is measured from SCADA unit.

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Global searching is an essential tool in the process of PV systems generation. This technique can find the GMPP of PV arrays under different shading and partial shading conditions. Even though the global search technique is well-developed and known, most of the studies that approach global searching do not mention restarting conditions. The ones that approached this issue proposed to trigger the new GMPP search based on power variation, irradiance variation, or fixed time step. These conditions disregard the fundamental shading statement, where shading is not uniform over PV power plants. Thus, the traditional resetting conditions presented by the current literature perform several unnecessary global searching. However, every search process introduces power oscillation and losses to the system, leading to voltage and frequency variations.

II. EXISTING SYSTEM

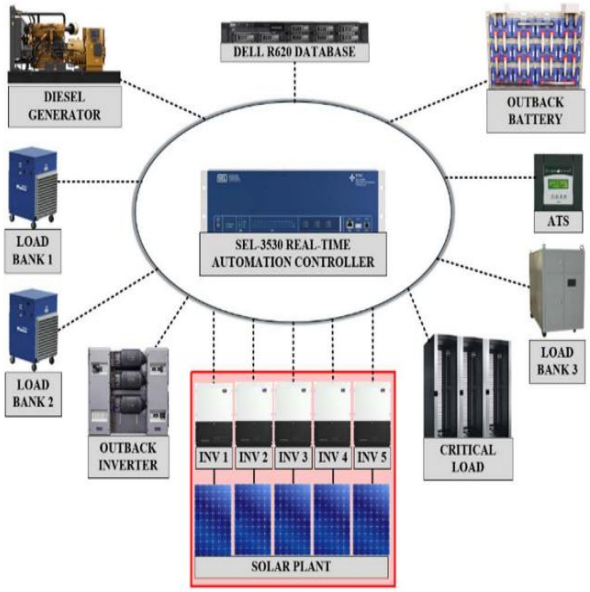
The power output of the solar panels follows a power-voltage (P-V) characteristic containing only one Global Maximum Point (GMP) in the normal conditions. However, under Partial Shading Conditions (PSC), the unbalanced irradiance in the panels creates Local Maximum Points (LMP) in the P-V curve. Standard control techniques for Maximum Power Point Tracking (MPPT) can not properly locate the GMP, stagnating in LMPs and generating losses in the energy harvesting.

. Specific techniques to locate the GMP are presented in the literature. However, the condition to restart the GMP is not widely discussed. The main challenges of global search algorithms are related to the restarting conditions. Avoiding unnecessary searching and providing an assertive GMP restarting condition is crucial for PV systems operation. In every GMP search, the solar inverters oscillate the power exchanged with the grid, causing frequency and voltage variations depending on the size of the PV plant.

This paper proposes a novel technique that uses a centralized controller to identify the shaded inverters, creating ags that locally start the GMP searching. The solution minimizes the number of times the search is performed by providing an assertive GMP restarting condition, saving energy, and avoiding unnecessary output power oscillation. The proposed control technique was evaluated using the data of a real 150-kW solar farm containing Ve inverters with two MPPT trackers each.

III. PROPOSED SYSTEM

Once the stopping condition is met, the exact GMPP is tracked by using the P&O method. The output result presented in the article proves the reliability of the method in certain partial shading conditions. However, this method is complex and thus considerably increases the computation cost of the system. In, a method called "extremum seeking control" is tested under different partial shading conditions. This method models the PV array characteristic in its tracking process on the basis of the segmental search concept. The technique is quite efficient in finding the GMPP; however, this method has system dependency and produces initial steady-state errors.

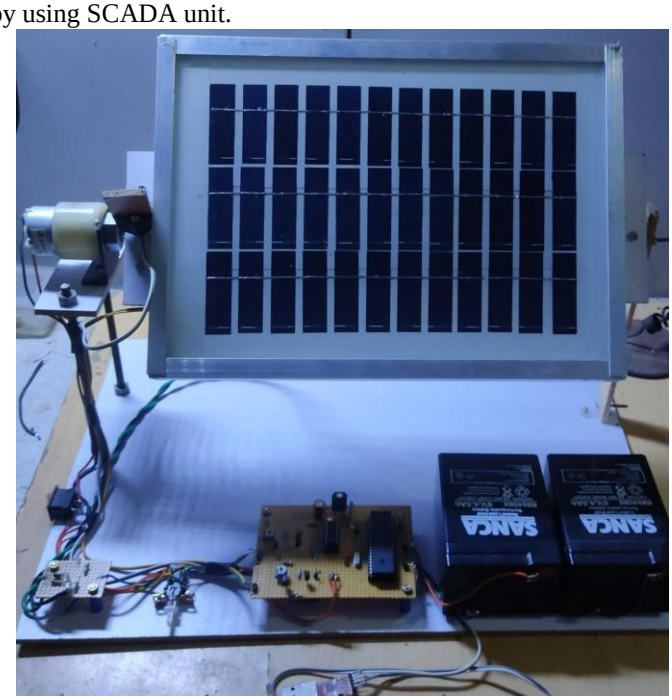


To overcome these problems in regional areas proposed system is designed to monitor the electric transmission line using Smart APP with WAN protocol. A centralized server (Microcontroller) will be responsible to see the electric pole status and control the pole activities to enable or disable power in particular area through WAN. As it is not feasible to monitor the central server full time, So the proposed system is designed to have emergency alert and control system for remote monitoring with the help of a smart APP modem will be connected to the central server which will send the emergency alert information to administrator and user.

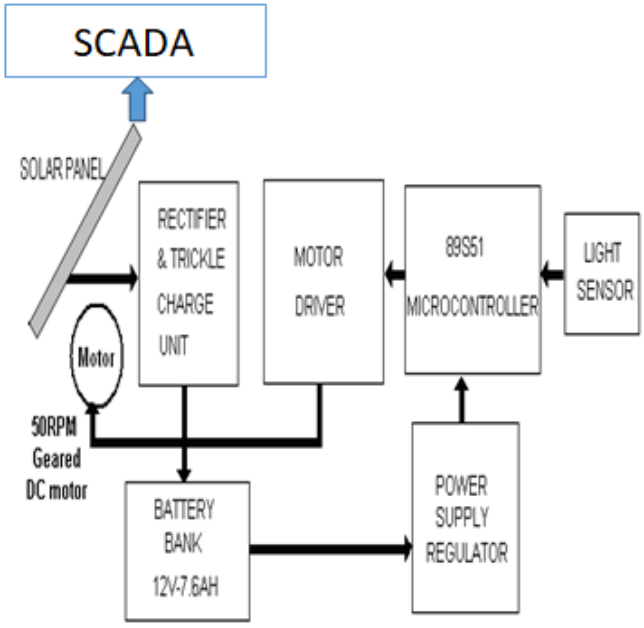
IV. BLOCK DIAGRAM

In this system consists of Light Dependent Resistor, Solar panel, H-bridge driver, Motor and AT89S52 microcontroller. The LDR is used to sensing the sun light and the resistance of the LDR is varied in accordance with the instantaneous value of the sun light radiation. The LDR is fixed near by solar panel. The output of the LDR is applied to input of microcontroller through transistor driver. The transistor driver is widely used to drive the input analog signal into digital logic level.

This logic level drives the microcontroller input. Depends upon the logical value the microcontroller is control the H-bridge. The H-bridge can be used to drives the motor rotation. The platform of the panel is attached on motor shaft. Based on motor rotation the panel axis are change and the direction is perpendicular to sun. The output of the solar cell is measured by using SCADA unit.

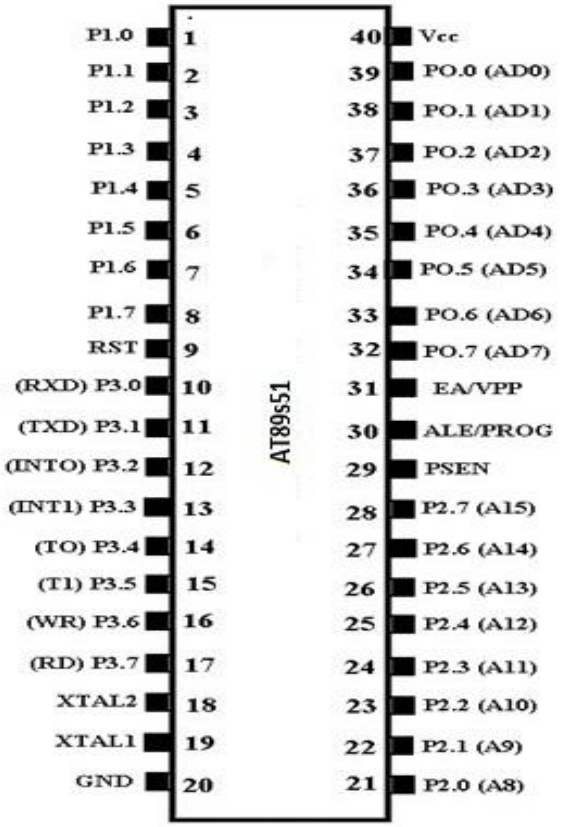


A photo resistor, light dependent resistor (LDR) or cadmium sulfide (CdS) cell is a resistor whose resistance decreases with increasing incident light intensity. It can also be referred to as a photoconductor.



A photo resistor is made of a high resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons

enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance. A photoelectric device can be either intrinsic or extrinsic. An intrinsic semiconductor has its own charge carriers and is not an efficient semiconductor, e.g. silicon.



A. MICROCONTROLLER(NUVOTON)

1) SPECIAL FEATURES OF MICROCONTROLLER

- Compatible with MCS®-51 Products
- 128 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- Two 16-bit Timer/Counters
- Low-power Idle and Power-down Modes
- Interrupt Recovery from Power-down Mode
- Watchdog Timer & Dual Data Pointer
- Flexible ISP Programming (Byte and Page Mode).
- Direct, indirect and relative addressing modes.
- Power-On Reset (POR).
- Power-up Timer (PWRT) and Oscillator Start-up Timer (OST).

V.FUTURE SCOPE OF THE PROJECT

A. MPPT-Maximum Power Point Tracking:

MPPT operating app : An application of operating MPPT by the help of smartphones can so be made operate from whenever via the internet.DC-DC running loads: DC from MPPT can be taken directly and DC load can be run.DC loads helps to consume low electricity.

Energy Management: There is need to manage energy when these algorithm are developed.The solar tracking system can be utilized for tracking the sun and thus pointing the solar panel at the point of maximum solar intensity.

Off-grid areas can be effectively electrified.Most efficient for pumping water and other agriculture applications.Govermental schools,hospitals can effectively use and thus help in improving their carbon image. Produces 40% more electricity per day.Powered by water displacement.Filters at least four liters of water per day.Easy assembly and maintenance.Inexpensive , Helps to earn carbon credits

The goals of this project were a purposely kept within what was belived to be attainable within the allotted timeline.As such, many advance improvements can be made up of initial design of solar tracker.It is felt this design represents a functioning scale model which could be replicated for a much larger scale. We can use wood and other locally available materials instead of Mild steel and thus reduce the cost further.A spring of appropriate stiffness could be designed to avoid sudden jerks. Provisions for safety of solar panels from rain.More accuracy can be achieved by providing measures against wind vibrations.

VI. CONCLUSION

In this project a solar panel tracker has been developed to increase the amount of power generated by the solar panel as the sun traverses across the sky. An 89S52 microcontroller was used to control the movement of the solar panel. The system was designed to be autonomous, such that energy generated by the solar panel would be used to charge two lead acid batteries. The system was successfully demonstrated during a senior design day presentation, although later subsequent testing yielded system design and/or implementation flaws.

VII. REFERENCE

[1]Chih-chiang hua Department of Electrical Engineering National yunlin university of science & technologies yunlin –A new maximum power point tracking method for PV string under PS condition IEEE 2017

[2]Sreekumar1 A V, Arun Rajendren2 1M.Tech, Department of EEE, Amrita School of Engineering, Kerala, India Maximum Power Point Tracking of PV Arrays under Partial Shading Condition using SEPIC converter IJRET Volume: 03 Special Issue: 07 | May-2014

[3]Ahteshamul Haque Maximum Power Point Tracking (MPPT) Scheme for Solar Photovoltaic System Pages 115-122 | Received 30 Jul 2014, Accepted 18 Oct 2014, Published online: 01 Dec 2014

[4]Luiz Fernando Lavado Villa, Tien-Phu Ho, Jean-Christophe Crebier, and Bertrand Raison, Member, IEEE A Power Electronics Equalizer Application for Partially Shaded Photovoltaic Modules IEEE transactions on Industrial Electronics, VOL. 60, NO. 3, March 2013

[5]Owen Cradock Maximum Power Point Tracking for Solar Power Applications with Partial Shading IEEE 2011