iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** III **Month of publication:** March 2019

DOI: http://doi.org/10.22214/ijraset.2019.3375

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue III, Mar 2019- Available at www.ijraset.com

PV Data Acquisition with Web based MPPT Controller using Labview

T. Karthikeyan[1], R. Ranjith Kumar[2], J Sangeetha[3]
[3]*Assistant Professror,* [1,2]*EEE Department, UG Prathyusha engineering college, Chennai, INDIA*

Abstract: ***The solar power demand is increasing due to its advantage and depletion of the non-renewable energy resource. In this case, energy produced from solar power should not be wasted due to various losses and to obtain a maximum output voltage, Perturb and observe MPPT algorithm is used. For these purposes, Monitoring of the solar power is essential and this done by the help of LabVIEW software and hardware in this paper. The LabVIEW software provides a GUI (Graphical User Interface) which is more user-friendly to the user. It contains programming feature in IOT (Internet of Things) which helps us to monitor the data through computer, phone by internet connection. The IBM Watson IOT platform is used as a platform to monitor the data from client side.***

Keywords: Single axis solar tracker, LabVIEW, IOT foundation, NI myDAQ, Perturb and observe method

I. INTRODUCTION

In industry level, remote monitoring of data is attaining more popularity. It reduces the work force of the company and the time taken for operation in a company. For this purpose, LabVIEW is very suitable software. It was created for programming easliy to the machine to work in automation field. It contains many features , we are using IOT feature for remote monitoring the maximum output voltage obtained by perturb and observe MPPT algorithm. In recent technology Power generation stations are monitored and controlled by automation .By these advantage, we can store the data of operation and from that data we can analyze to provide a solution for a problem .The solar panel should be continuously connected to the hardware which is interfaced with LabVIEW software. The hardware used in this project is NI myDAQ, which is a student kit. By accessing to IBM WATSON IOT platform and entering the correct MAC(Media Access Control) address of the hardware interfaced system.

II. LITERATURE SURVEY

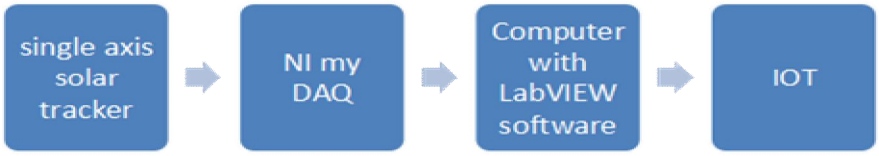
[1] The power generated by photovoltaic panels is monitored by using labVIEW web publishing tool and NI data dashboard. The data viewable only in internet explorer and it only viewable in computer with LabVIEW software and data dashboard is for very limited range.[2] The Power generated by pv panel and consumed by load is monitored through web browser programmed in LabVIEW. It has good user interface but it also needs remote computer with labview software run time engine module for monitoring [3] The modified perturb and observe mppt algorithm is implemented by LabVIEW.[4] 2D tacking system for solar panel is designed to track solar energy effectively by labview vision and motion module[5]The behaviour of characteristics of solar panel is studied in offline and real time simulation mode in LabVIEW [6] The perturb and observe mppt algorithm and boost converter in LabVIEW ,the remote monitoring is not implemented.[7] the remote accessible of solar energy programs by LabVIEW web services and remote panel is designed in this paper, It again need a system with the LabVIEW software for monitoring purpose.[8] the remote monitoring is done by the internet of thing in LabVIEW program, this makes monitoring without the need of system with labVIEW software, In this mppt tacking and converter is not used.[9] It help to know about the configuring of the NI myDAQ and how to use it.[10] It helps to know about the IBM WATSON IOT platform for monitoring purposes and how to use it.

III. PROPOSED SYSTEM

In this system , the solar irradiance is ensured to fall on the photovoltaic panel continuously. This made possible by using the single axis horizontal solar tracker by the input of light dependent resistor. This operates by automatic manner, there is no need of controlling part. The output of the photovoltaic panel is given to the NI myDAQ hardware which acquires data and send to the LabVIEW software. This hardware is low cost device among national instrument DAQ. In the software ,Perturb and Observe mppt algorithm and boost converter operation was programmed. This algorithm is simple to implement and effective in performance. The maximum output voltage from the algorithm simulation is uploaded to internet of things by the LabVIEW program. By this way , there is no need of the special equipment to connect to internet. The remote monitoring of the process is possible from smart phones, tablets, laptop.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue III, Mar 2019- Available at www.ijraset.com

IV. EXPERIMENTAL SETUP



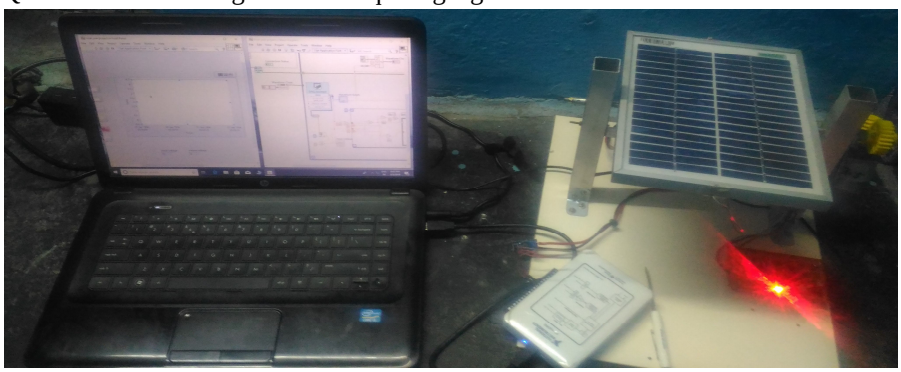
A. Hardware Setup

1) Single Axis Solar Tracker: Solar panel is a device which produce electricity when sun light falls on it. Every time sunlight not falls on solar panel properly. This is due to the shadow of object like tree and due to rotation of earth .For effective generation of electricity; solar panel has to be tilted to track the sun light. This is done by the help of LDR(light dependent resistor) and electrical circuits. The solar panel used is 12v panel. The combination of solar panel , LDR, electrical circuit and motor forms the single axis solar tracker to perform automatically.

2) Voltage sensor: This DC Voltage Sensor Module is essentially a 5:1 potential divider circuit built using precession resistors for high accuracy .This is used because , myDAQ analog input is limited to a 10 VDC input. If you wish to measure higher voltages, this module allows you to measure voltages of 0-25V. This ensures the myDAQ safety limit and prevent from damage to the equipment due to overvoltage and short-circuit problem.

3) NI myDAQ: It is a low-cost device which acquire data from the electronic and sensors. It uses NI LabVIEW based software instruments for students to analyze the real world signals. With NI LabVIEW on PC, student can analyze and process the obtained signal and perform simple process anytime. It contains terminal like analog input port, analog output port, digital input/output port, power supply, Digital multi meter. Getting started with NI myDAQ is a simple process. The LabVIEW software must contain the installed package of NI-DAQmx in it and connect the high-speed USB port of the computer to the device. Now make configuration on your requirement.

4) Hardware Interface: The small hardware interface steps like the output from the solar panel is connected to the voltage sensor + and - terminal. The voltage sensor has s, +, - output terminal .The s and - terminal of sensor is connected to the AIO+ and AIO- terminal of myDAQ hardware which is connected to the laptop through USB cable. After interfacing the myDAQ to computer Open LabVIEW and choose New VI in the block diagram of VI by right clicking there appears a small window with controls then search for DAQ Assistant and configure it for acquiring signal.



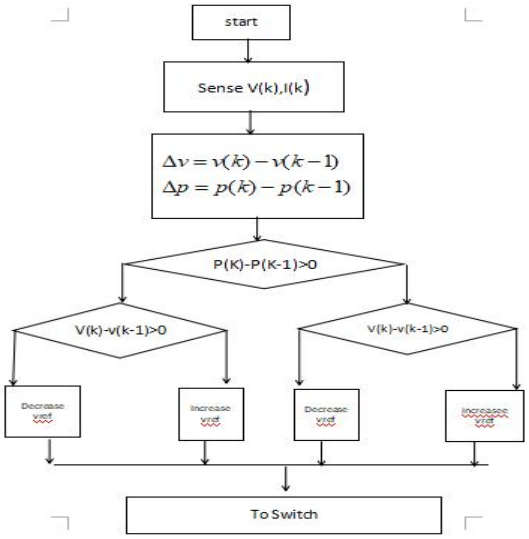
The total hardware interface of the project

B. Software Setup

LabVIEW is known as data-flow programming and a graphical programming language, because it performed using a graphical block diagram and that compiles to a machine code .By this syntactical details are eliminated. It contain front panel and block diagram. The front panel is used for indicator and control parts and block diagram is used for programming part.LabVIEW is interfaced with NI myDAQ to get signal from sensor and actuators.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue III, Mar 2019- Available at www.ijraset.com

1) *.Perturb And Observe MPPT Algorithm:* By the help of NI myDAQ, the reading is given to the perturb and observe algorithm which is programmed in LabVIEW. The conventional P&O MPPT algorithm is the simplest method of MPPT to implement. In this algorithm only voltage is sensed for operation, so it is easy to implement. In this methodology power output of system is checked by varying the supplied voltage. It is also called hill climbing method. It is the most commonly used MPPT method.



This diagram represent flow chart of perturb and observe MPPT algorithim.

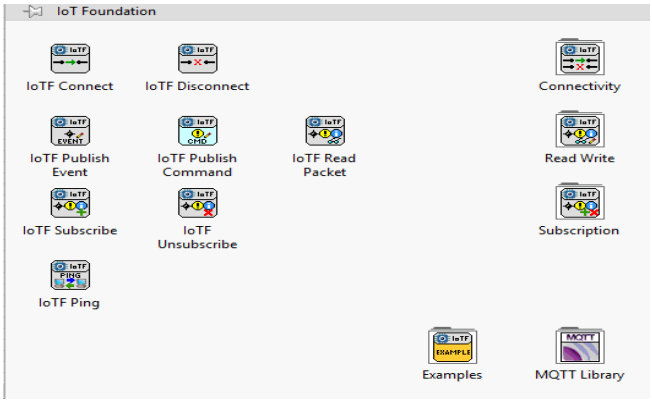
2) *DC to DC Boost Converter:* It is a converter which boost one voltage level to another voltage level. This is popularly used in pv application .The input given to the converter is the unregulated voltage and output we get is a regulated voltage. The output voltage from the converter is more than the input voltage.

The output voltage of this converter is

V=Vin/(1-D)

Here D is the duty ratio used to operate the operation of the mosfet switch in the converter. By this formula we can able to obtain the maximum output voltage.

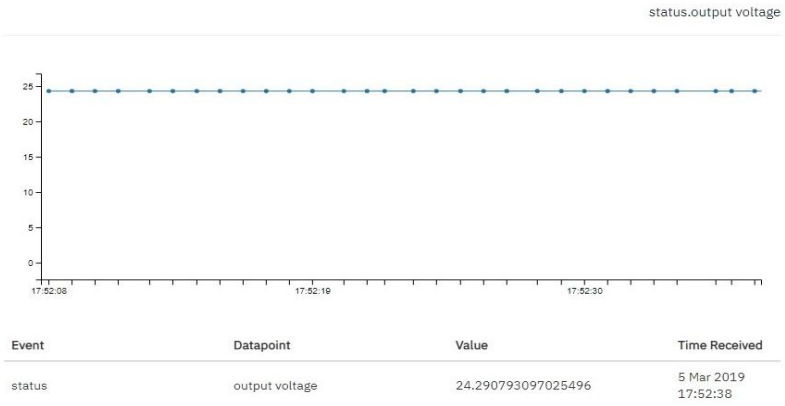
3) *IOT Technology In Labview:* In the history of the software industry, Internet of Things is becoming one of the most relevant trends, and also in the history of computer software comparing with other trends. IOT is starting to produce a new generation of platforms IOT platform is an open source platform. There are many benefits with IOT platforms such as cost, speed, global scale, productivity, performance and reliability. We can create many rules in the cloud to give notifications to the people to take action in real -time to improve the process. Algorithms can be written in cloud to optimize the process. This functionality is not available in LabVIEW as a default option. This is obtained from VI package manager which provides many additional features to LabVIEW platform. This is created by Espotel company.



This picture represent the IOT foundation function tools.

II. RESULT

The maximum output voltage obtained by the Perturb and observe algorithm and boost converter is given to the IBM WATSON IOT platform . This output is easily accessed by the user who have the authorized MAC address of the system



Event	Datapoint	Value	Time Received
status	output voltage	24.290793097025496	5 Mar 2019 17:52:38

This Picture represent the output voltage monitored in website.

III. CONCLUSION

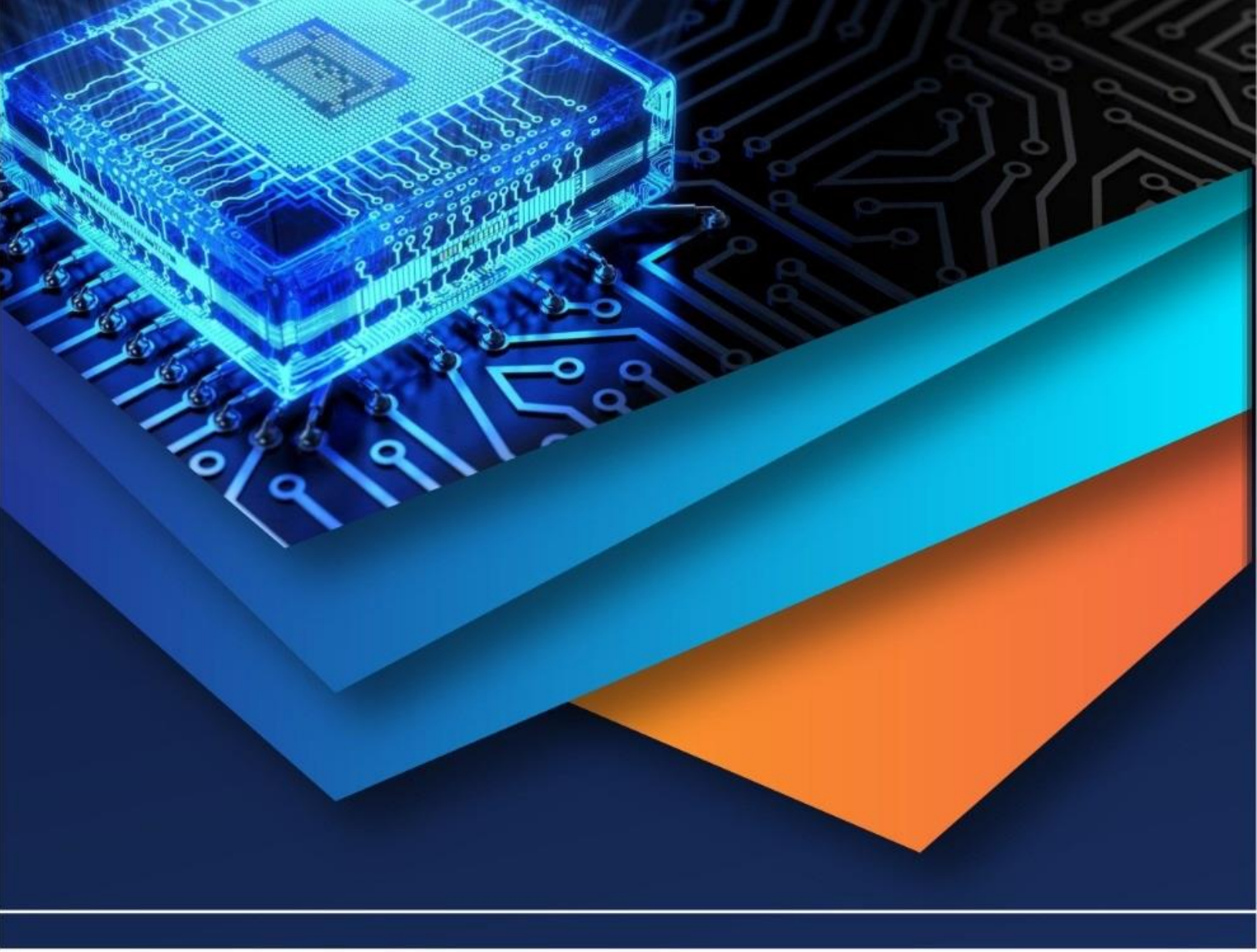
The maximum output voltage of the MPPT controller simulation is monitored by the help of IOT platform in LabVIEW. This help in identifying the problem arises in generation of electricity in large scale power plant and the data is also stored for documentation purposes.In the future ,there is scope for extension of project in controlling of whole system through IOT and the implementation of the mppt controller and converter in hardware.

IV.ACKNOWLEDGMENT

We like to thank Kalpana, Assistant professor of ECE Department for continuous support by providing the hardware and software of LAbVIEW from the beginning of the project.

REFERENCES

[1] Solar Power Remote Monitoring using LabVIEW by,O.Bhulakshmi Devi PG Scholar [P.E], Department of EEE, G. PullaReddy Engineering College, Kurnool, Andhra Pradesh, INDIA.
[2] Solar Power Remote Monitoring and Controlling Using Arduino, LabVIEW and Web browser byHaider-e-Karar l,Aziz Altaf Khuwaja,Abdul SattarDepartment of Electrical,Engineering Sukkur IBA.
[3] Design and implementation of MPPT solar system based on the enhanced P&O algorithm using LabVIEW,GAGA Ahmed , ERRAHIMI Fatima[y], ES-SBAI Najia[z]
[4] 2D Tracking System for Solar Panels Using SVM Implemented by Motion Assistant of Lab VIEW by Santhosh K V,Tamal Dutta Department of Electrical Engineering ,NIT Silchar andJ S Rajshekar,Department of Instrumentation Technology,DSCE, Bangalore
[5] Real Time Simulation of Solar Photovoltaic Module using LabVIEW Data Acquisition Card by Yatendra Yadav, Rajiv Roshan, Umashankar S,D.Vijayakumar,School of Electrical Engineering,VIT University, Vellore, India.
[6] A Maximum Powerpoint tracking using Perturb and Observe algorithm by LabVIEW anf arduino by D divya,A Karthikeyan,G Pannnerselvam ,D Priya of Vel TechMultiTech DR.Rangarajan DR.Sakunthala Engg.College, chennai.
[7] LabVIEW Remote Panels and Web Services in solar energy experiment-A comparative evaluation by P Bauer,R Ionel from Delft university of technology,netherland.
[8] Condition Monitoring of a Virtual Solar System using IOT by J.Laxmi Prasanna, D.Lavanya ,Dr.T. Ankil kumar of EEE Department,Anurag group Of Institution,hyderabad,INDIA
[9] Official ni websitehttp://www.ni.com/ NI my DAQ
[10] www.ni.com,A practical guide for connecting LabVIEW to the industrial IOT



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY