

# Study of IoT based Solar Data Logger

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**Abstract**— The proposed technique depends on an electronic gadget which can investigate the physical wonder of this present reality. It can accumulate the data and information by means of an outer instrument or sensor. The information is gathered over a specific timeframe. The system is excessively founded on advanced preparing, for example PC, so data can likewise be put away or separated from the memory. The separate theory centers around managing the basic parameters of a sun powered board like voltage, current and temperature.

**Keywords**— Data, Data logger, IoT, Solar PV module, solar PV power station

## I. INTRODUCTION

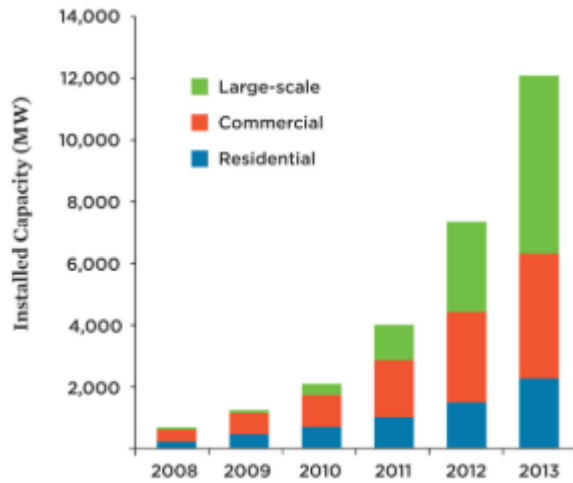
The sun is the wellspring of brilliant light just as warmth or the main wellspring of sun powered vitality. The sun can radiate the vitality continuously to 5 billion years more. Sun based Energy has been saddled utilizing a scope of consistently advancing advances, for example, sun oriented warming, photovoltaic, sun based warm vitality, sunlight based cells, liquid salt power plants and counterfeit photosynthesis (to produce clean energy)[1]. It is a huge supply of sustainable power source and its advancements are extensively considered as either aloof sun based or dynamic sun oriented relying upon how they limit and arrangement out sunlight based vitality or convert it into sun powered power. Dynamic sunlight based methods incorporate the utilization of photovoltaic frameworks, fearless sun oriented power and sun based water warming to make utilization of the vitality. Aloof sun oriented strategies incorporate situating a working to the sunlight based waves, choosing materials with supporting warm mass or light-scattering attributes, and planning spaces that normally stream air[2][3]. In 2011, the International Energy Agency called attention to a critical comment in regards to advancement of sun powered advances. They said that the progression of reasonable, boundless and clean sunlight based vitality advancements will have tremendous longer term benefits. It will improve nations vitality security through dependence on an indigenous, endless and for the most part import free asset, help supportability, decrease contamination, bring down the expenses of relieving an Earth-wide temperature boost, and keep petroleum derivative costs lower than something else. These focal points are extensive. Consequently the extra expenses of the motivators for early utilization ought to be

considered as learning ventures; they should be astutely spent and should be generally shared[7][8]. Today, sun based types of gear, with the assistance of helpful information lumberjacks, can be streamlined to convey the monetary advantages, private and business clients anticipate to accomplish through their ventures. This postulation subtleties how sunlight based installers and designers use information lumberjacks to decide execution of sun powered warm frameworks, bring up any deformities or wasteful aspects, and advance execution for predominant return as could reasonably be expected. Because of steady changes in sun oriented systems and talented tasks has additionally lead information lumberjacks to change more rapidly now than any time in recent memory. The tradition reproduction of an independent information lumberjack is moving to one of a gadget that gathers information yet additionally approaches remote correspondences for cautioning of activities, routine announcing of information and remote control[5].

## II. LITERATURE REVIEW

Sun based power is the adjustment of daylight to power, which may be specifically utilizing photovoltaic (PV), or in a roundabout way utilizing concentrated sun oriented power (CSP). CSP frameworks use focal points or mirrors and following frameworks to focus a vast region of daylight into a smaller than expected pillar. PV changes over light into electric flow utilizing the photoelectric impact (marvel of outflow and stream of electron under the activity of light). Sun based power has been unsurprising to wind up the world's driving wellspring of power by 2030, with concentrated sun based power and sun powered PV cells (photovoltaic cells)contributing 10 and 18 percent to the worldwide generally speaking usage, separately. In 2016, after one more year of fast advancement, sun powered produced 1.2% of overall power. Business-related concentrated sun based power plants were first created around 1980s[10]. Sunlight based power in India is a fast creating industry. In the up and coming time, India will totally depend on the sunlight based vitality so as to battle against vitality emergency. The nation's sunlight based introduced limit achieved 23000 million watts starting at 30 June 2018. India stretched its sunlight based power age limit multiple times from 2,650 MW on 26 May 2014 to more than 20 GW till 31 January 2018. The 20 GW limits was essentially protested for 2022 yet the administration accomplished the objective four years in front of plan. The

nation extra 3 GW of sun oriented limit in 2015-2016, 5 GW in 2016-2017 and more than 10 GW in 2017-2018, with the typical flow cost of sunlight based power dropping to 17% approx beneath the ordinary cost of its coal terminated relating item[15].



**Figure 1:** The Growing Scale of PV cells

It is important to continue checking the execution of the sunlight based power plants so we can investigate the framework execution and thus can ascertain the productivity of the sun oriented PV modules dependent on sun powered radiation level and some natural components. Along these lines, with the assistance of this information, we can break down and think about the framework execution. A few changes can be made in structuring the sun based PV cells by utilizing the investigation and examination of the power plant if necessary. For this reason, numerous sorts of types of gear like climate stations are accessible in the market which logs the estimations of temperature, dampness and sun powered radiation. These climate stations are much expensive and are not monetarily plausible for little kW go sun oriented PV stations. Additionally, these climate stations are utilized to log the natural parameters, however for the total investigation and study, we require the ongoing estimations of current and voltage of sun based PV module too. In this way, it is important to have such gadget that will gauge and store every one of the qualities on the server which are required for the investigation. We are planning such information lumberjack which will gauge current, voltage of the sun powered PV modules, temperature and mugginess at the task site and sun powered radiation level, and it will store the information on the server that can be gotten to from anyplace. The sun oriented observing structure made out of intensity meters, information lumberjacks, string current sensors, inverter interface framework, and climate stations is a standout amongst the most seen segments of a private and business measured area. The information lumberjack entrance is the focal gadget for social affair this insights and changing over it into important data and cautions. Dependability issues to the

information lumberjack framework can and will affect the capacity to perceive issues with the framework, investigate and resolve them in a financially savvy manner[12].



**Figure 2:** Off Grid Monitoring System

## II (A): BUILDING BLOCKS OF A DATA LOGGER

### •Transducers or Sensors

A gadget that changes over a physical wonder, for example, light, temperature, weight, or sound into a quantifiable electrical flag, for example, voltage or flow.

### •Analog to Digital Converter

The information lumberjack faculties just advanced signs and subsequently simple signs, it might changed over to computerized flag.

### •Microcontroller and Storage

Microcontroller is utilized to change over advanced signs into twofold frame, stockpiling used to store the changed over computerized flag.

### •Display

The information lumberjacks interface alongside a PC and utilize the individual programming to turn on the information lumberjack and see and examine the gathered information, while others have a neighborhood interface gadget (keypad, LCD) and can be utilized as an independent appliance[4].

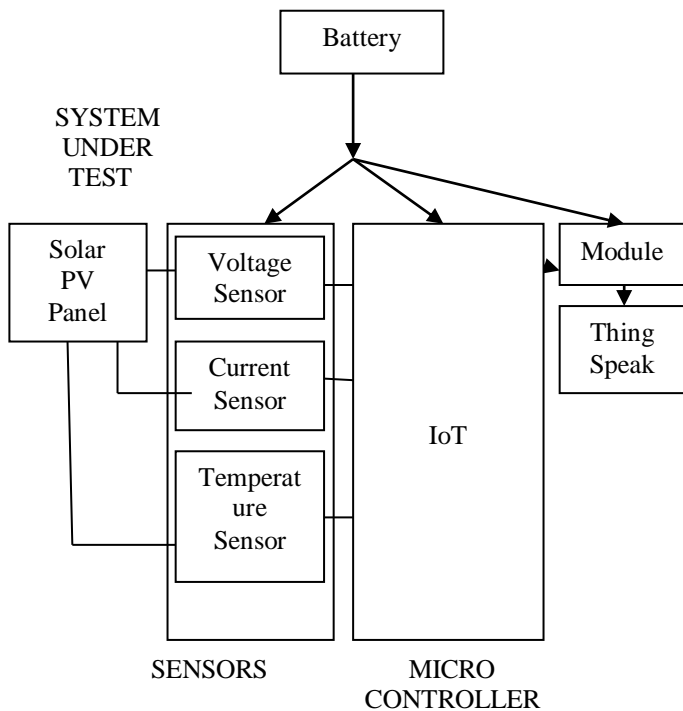


Figure 2: A PROPOSED SYSTEM

II (B): DATA LOGGER TOPOLOGIES-

- Stand Alone  
Stand Alone hardware can continuously measure and log data without connection to PC.



Figure 3: Stand Alone

- PC Based  
Operation requires full time connection to PC over any appropriate bus technology<sup>[11]</sup>.



Figure 4: PC Based

II (C): ADVANTAGES-

- Upgradable for higher current and voltage ranges
- Economically suitable for small scale solar PV power projects.
- Simple to construct the circuit.
- Anyone can view the data.
- All the data regarding the analysis including graphs and charts is available on the server.
- Values are automatically calculated and displayed on the webpage and mobile App<sup>[14]</sup>.

III. OVERVIEW OF THE DESIGN

A shrewd information schematic as appeared in figure 3 for sunlight based power plant is depicted in this paper. The information is fit for obtaining the qualities for Battery voltage, Battery current, PV voltage, PV current, Grid Voltage, Grid current, and temperature. The PV voltage is detected by voltage divider circuit, PV current is detected by utilizing shunt with differential intensifier, Grid Voltage is detected by potential transformer with accuracy rectifier, Grid Current is detected by current transformer with exactness rectifier, Battery Voltage is detected utilizing voltage divider circuit, and Battery Current is detected by utilizing shunt with differential enhancer. The module temperature is estimated by LM35 temperature sensor.

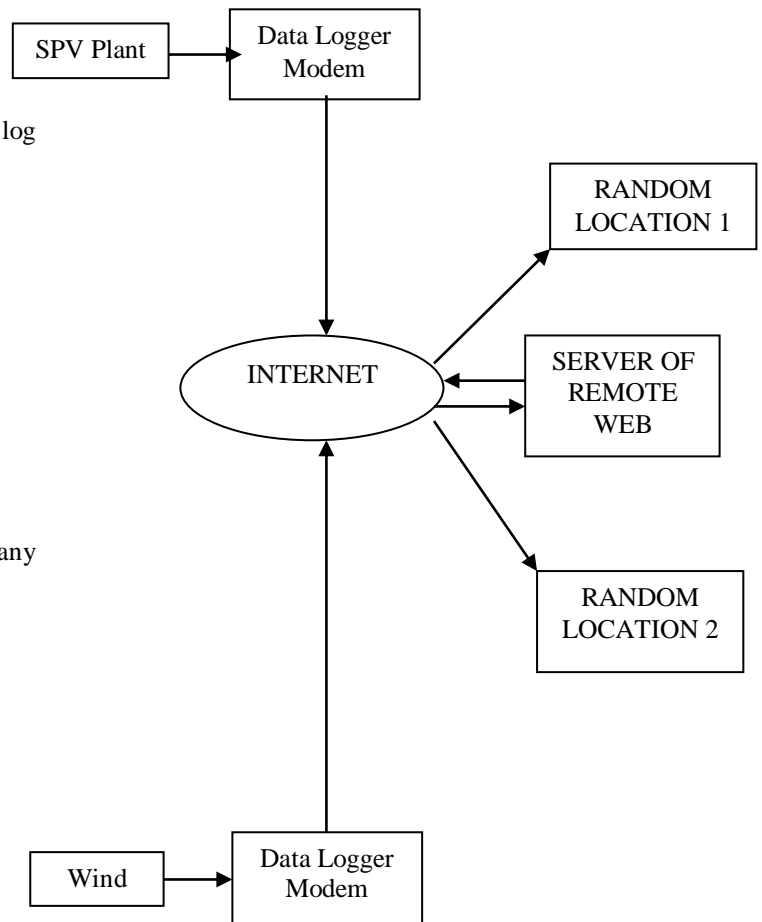


Figure 5: SCHEMATIC OF A PROPOSED SYSTEM

#### IV. RESULTS AND DISCUSSION

The convention technique for monitoring and analyzing the performance is tacky. We have to go the solar power system and temperature cannot be even measured.

The technique isn't compact just as talented laboris required. The individual IoT based framework gives a simplicity to dissect through versatile. Indeed, even a non-specialized individual can screen. The framework also gives a caution through alert, trailed by quick activity of stumbling off the supply[13].



**Figure 6:** Data Logger Application for Weather Stations

#### V. CONCLUSION

Simple pertinence of information lumberjacks permit to assess and watch close planetary system execution, make the installers to address blames and calibrate framework execution. Thus, customers are at risk to increase self-faith in the innovation, impelling what is relied upon to be a promising business sector for sun oriented technology. The uniqueness of the arranged framework is that it will be less demanding to dissect the execution of a sun oriented power plant in an all encompassing tallness. The IoT based framework will populate dedicated web server based database with constant information of the plant parameters, that will enhance the goals enhancement procedure of the concerned expert. The creation observing, blunder location of the plants continuously will be recognizable in the system support. Substantial scale network reconciliation of the sun based power plants will require enormous information investigation for end or basic leadership.

Utilization of IoT for observing of a sun oriented power plant is insignificant venture as step by step sustainable power sources are including coordinated into utility framework. In this manner mechanization and of sun oriented power plant observing will raise future basic

leadership process for extensive scale sunlight based power plant and matrix coordination of such plants. The paper, we anticipated an IoT based remote checking framework for sun oriented power plant, the methodology is considered, executed and effectively accomplished the remote transmission of information to a server for supervision. IoT based remote observing will help vitality productivity of the framework by making utilization of low power devouring propelled remote modules along these lines diminishing the carbon impression. Web Console based interface will fundamentally lessen time of manual supervision and help during the time spent planning undertaking of plant the board. An arrangement of development remotely deal with the Solar PV plants of different activities like remote shutdown, remote administration is to be join with this framework later.

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