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IOT Based A Smart Solar Photovoltaic Remote Monitoring and Controlling System

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Abstract -In this paper proposed an answer and method to observe and control the information and dust which is accumulated on the solar panels to introduce the outermost power from for effective utilization. Always the output power of the electrical device depends on the radiation reached to solar panels. All the arrays of the panels are connected to every other and sensors are directly connected to the controller which are control and monitor the solar panels and loads. By assimilate the IOT(internet of things) technology the info received from the solar panels and appliance are send to the cloud from through internet for the long run use yet user and control and monitor the parameter of the connected devices. The user can see the current yet because the previous current and voltage data and average parameter like surrounding temperature, sun light voltage and current employing a graphical computer programmer (GUI). The controller is programed with predefined conditions which are false or finding any faults in panels and loads when it alerts to user. Node MCU is employed as a controller.

***Key Words*:**IOT, Node MCU, GUI, Solar panels, LCD

1.INTRODUCTION

Solar power plants must have monitored for excellent power output. This helps to recover efficient power output from solar plants while monitoring the faulty solar panels, connections and dust assembled on panels lowering output and other factors affecting solar prosecution. In this project I proposed an automated IOT based solar power plant monitoring and controlling the system that allow to monitor the solar plant from anywhere by using the internet. In that we are using an NodeMCU controller to control and monitor solar panels parameters. This system constantly monitors the solar panels and sending the data to IOT system by using the internet.

The overall data or power outputs are stored on the cloud and it will give the feedback when faults are generated on solar plant by sending message, email etc. it now display all the parameters to the user by using an effective GUI. In this system I am using a cleaning system to clean a dust which is accumulated on the panels. This system needs for to get an accurate data or power output without any losses.

2.LITERATURE SURVEY

1) Development of an IOT based solar power monitoring system. This system allows for automated solar power monitoring form anywhere over the internet and also alerts to user when output falls below certain conditions.
2) In this paper introduced to development of an online monitoring and controlling system for distributed renewable energy sources based on android. This method used a Bluetooth to interface android mobile phone as a communication link to exchange the data with digital hardware power controlling unit.
3) This paper main propose of to solve management problem and solar plant maintenance problem which is generated in process of solar power generation that's way designed a remote monitoring intelligent monitoring system using Tiny OS for monitoring and maintenance.

3.PROPOSED METHODOLOGY

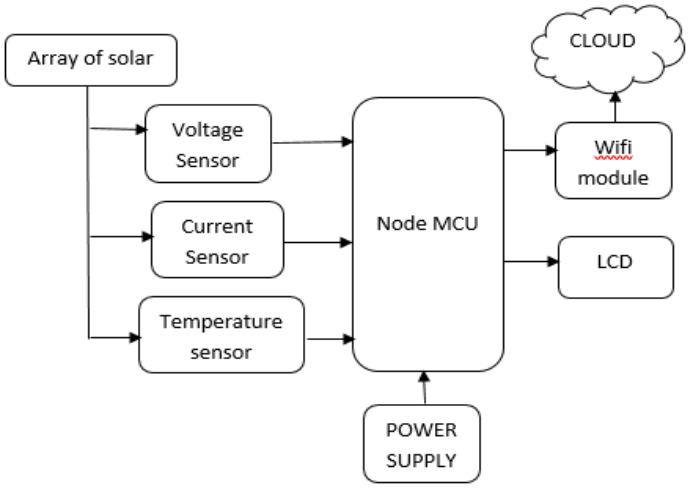

Fig 1. Block diagram of solar system

In this project we are implemented a solar panels these are arranged in number of array, the main purposed of this project

to observe the efficiency of each array and generated an alert when the efficiency falls far off the certain conditions.

Every array of solar panel are connected to the hardware which remains observe efficiency. The hardware contains temperature sensor, current sensor and voltage sensor, using this sensor we are able to measure temperature, voltage and current value which is generated by the certain array.

3.1. NODE MCU

All the calculated data by Node MCU which is processed to wifi module which is stored on a IOT(Internet of Things) server. Using IOT to Node MCU(Node Micro Controller) is an open source software and hardware development environment that is built around a very inexpensive System-on-a-chip(SoC) called the ESP8266.

3.2.VOLTAGE and CURRENT SENSOR

As INA219 is current and power sensor which gives that total power consumed by shunt load and gives respective reading in digital form to Node MCU . Node MCU with program loaded in it, calculates the current and voltage reading of shunt loaded.

3.3 LCD(Liquid Crystal Display)

LCD is used for the display temperature, voltage, current and power which is generated by the solar panels. LCD is connected to the Node MCU is a processer.

3.4.Wi-Fi MODULE (ESP8266)

All the calculated data by Node MCU processed to the wifi module which is stored on IOT . Analysis all the data daily, weekly and monthly using IOT.

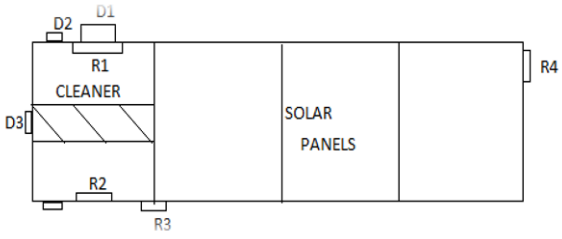

Fig 2. Solar Panel cleaner Diagram

According to the dimensions of the solar panels, the cleaner is being designed and arranged on the solar system. The main component of the cleaning system is brush which is driven by DC motors. The cleaner is controlled by the Node MCU. The Node MCU are used for each frame to control the cleaning process using wifi or internet

The soft brush are used to clean a solar panels so that it will not damaged the transparency of solar panels. The frame of cleaning brush is moved along the length of the solar panels in vertical directions at the same time this brush will rotted for cleaning of the dust from the panels. DC motors(D1,D2,D3) are used to rolling the frame and reed switch(R1,R2,R3,R4) are used for machine as it will go on the end of the solar panel array.

4.SYSTEM IMPLIMENTATION

Fig 3. Solar Panel System

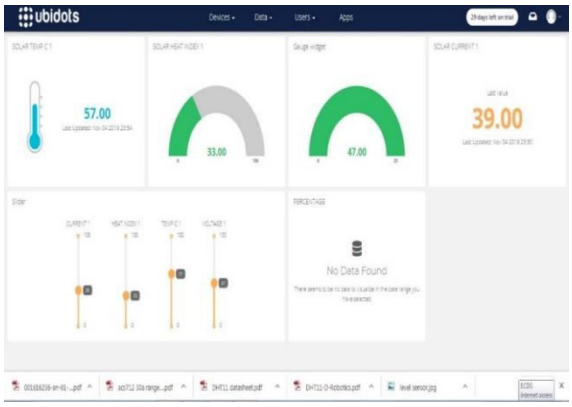

Fig 4.using ubidots fatching the data

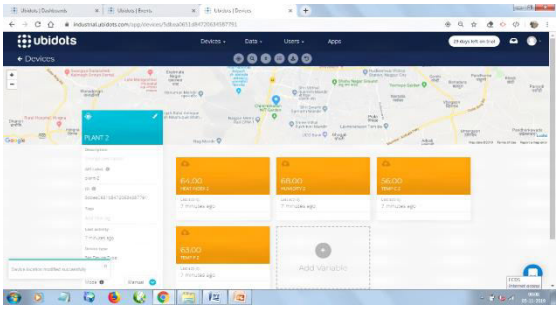

Fig 5. Using ubidots tracking solar system

The ubidots is used in IOT platform. Ubidots are turns all the sensor data into information which is stored on the server or cloude and also by using ubidots we can track the our solar system location. APIs device are used for sending and receiving the

data form the server or cloude with simple and secure connections.

The alerms can be set by using ubidots. The alerts can be in the form of message, mail, voice call etc. tosuccessfully observe efficiency of every panels.

4.1WORKING

The Main objective of this project is a to induce an optimum power output from the solar panels during dust is accumulated thereon. In this project I proposed an automated IOT based solar energy plant monitoring and controlling system we are get information about the weather. The system alerts the utilization when given conditions is full and display on the LCD. The solar panels are monitoring the sun rays with different parameters like temperature, current and voltage are displayed on the LCD using IOT technology. All the data send to the cloud using IOT. All the info arefaching by cloud platform what information is helpful and this data is wont to detect faults or detect possible problems. In this system used cleaner to scrub a dust which is accumulation on electrical device to save lots of the ability losses and obtain accurate power output.

5. CONCLUSIONS

In this system contineous tracking the solar power plant and analysis the data daily, weekly and monthly. It becomes efficient and easy to analysis the data and also detected faults which is electrical or envormental occurred on a solar plant.

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