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SOLAR MONITORING USING IOT

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Abstract: Internet of things is used in generation of solar power to improve the function, monitoring, performance and maintenance of solar power plant. The method for the solution to monitor the dust present on the solar panels to observe the maximum power. Always the output power of the solar panel is depend on the radiation observed by the solar cell. It monitors the panel loads by using the IoT technologies the data which are received from the panels and appliance are send to the cloud through the internet for the future use. It is also helps the remote users to monitor the solar power plant. The user can get the information about current and previous average parameter like voltage, temperature, current and sunlight using graphical user interface. This will facilitate fault detection and preventive maintenance of solar power plant.

Index Terms **- Solar panel, IOT, Thingspeak, Cloud computing.**

I. INTRODUCTION:

The monitoring of solar power plant is needed to obtain optimum output power. This efficient output power plants while monitoring for connections, accumulation of dust or any other fault in solar panels affects the solar performance by lowering by output IOT based solar power monitoring system allows solar monitoring over the cloud and check whether there is a problem in solar panel connection by lowering output to find the problem occurs in solar panel. The ATmega controller used to monitor the parameters in solar panel. They monitor the solar panel and transmit the output to the IOT Thingspeak transmits the solar power parameters in the Thingspeak server.The parameters is displayed by using GUI and when the output falls below the specific limit it alerts the user, there is a problem in solar panel connections or any dust particles on the solar panel. This makes the monitoring of solar panel easier and ensure best power.

II.LITERATURE SURVEY:

The development of monitoring online and the control of system is based on android platform by bluetooth interface of mobile phone as a communication link it creates data exchange with the hardware of power conditioning unit, with the help sensing circuits the value of current and the voltage measurement of the renewable source is processed by the micro controller of the microchip. Then the parameter are sent to the personal computer over USB and the system is observed instantly. The system is monitored daily,weekly and monthly.

Goto, Yeshihiro,has explained that the integrated system that monitors and manages the has developed and it has started operation.The system can operate and maintain above 200,000 telecommunication power plants,which includes inverters,rectifiers and air conditioning plants,is installed above 8000 buildings to improve the user interface which use the communication technologies and the information of feature system and it integrate management and remote monitoring functions into single system.

III.EXISTING METHOD:

The Method used in solar monitoring using IoT have several steps as described in the following flowchart fig 1 to establish the connection between controller and network. It reads the sensor value such as current and voltage. The value gets displayed on LED. Then upload the data to the cloud and receive message in the mobile is the greatest advantage because it track the information from any location. The collection of information about climatic changes like temperature, day/night mode is monitored by the sensors also checks power generated on the field.

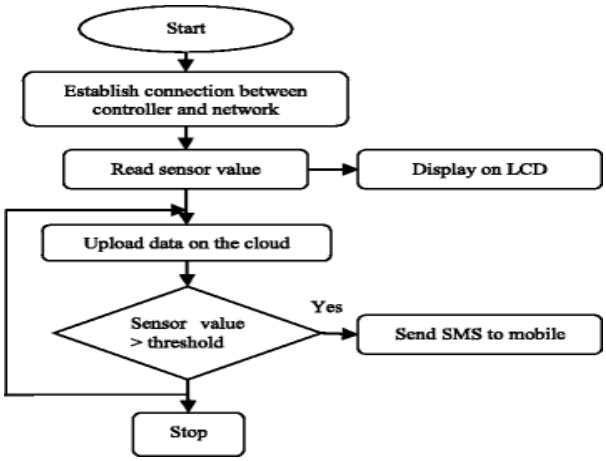

Fig 1: Flow Chart

IV.PROPOSED METHOD:

Fig 2: Block Diagram

ARDUINO UNO:

The purpose of Arduino UNO is high functionality with familiarity and simplicity .Arduino UNO acts as a bridge between the solar panel and Internet of Things(IoT).It is powered with 5 volts dc supply for its operation.

VOLTAGE SENSOR AND CURRENT SENSOR :

The voltage sensor and current sensor able to monitor and measure the value of voltage and current. These power sensors that gives the power consumption of shunt load and gives the respective reading in digital form to the Arduino UNO.

ESP8266 Wi-Fi Module:

The calculated data by Arduino is processed by Esp8266 Module to store the data in the IoT or Cloud. In order to analyze the data on monthly, weekly and daily basis by using the popular IoT. This is a self-contained with integrated TCP/IP protocol stack that can give any micro controller access to the network. This ESP8266 wi-Fi Module is capable of either offloading all Wi-Fi networking functions or hosting an application from another processor. The ESP8266 Module comes pre- programmed with an AT command set firmware, meaning, we can simply hook this Arduino device .This module is an extremely cost effective board with a huge, community and ever growing.

WORKING:

The data from the different solar panels are collected by Internet of Things and it shares the information to the address specific needs. The IOT platform such as Thingspeak, and cloud platform can take the useful information and ignore other information. By using this information can detect the faults, and reduce the problem before they occur. Information by the connected sensors such as voltage sensor and current sensor used to decide perfect decisions based on real time information which reduces the money and time. Solar monitoring systems works through our solar system inverters. Companies offer solar inverters with properties monitoring software setup. To convert DC current into AC current solar inverter is used in home appliances, information about power level and production is gathered and send to cloud-based monitoring systems and their related apps. LCD is used to display the value of voltage and current obtained in the solar panel. The information can be accessed in severalways by the user through mobile apps and paired smart home devices.

Fig 3: Hardware Setup

Fig4 : Simulation Results

CONCLUSION:

This method has continues tracking of solar energy weekly, monthly and daily analysis becomes simple and economical additionally by this analysis it is potential to observe any fault occurred at intervals power station because the generated power might show some inconsistency in data of solar energy plant. Non-conventional form of energy which can be endlessly relished by process. The solar array voltage generation is one among the higher solution for clean energy production by observation and controlling the voltage generated by our planned system we have a tendency to might overcome the drawbacks of earlier proposed system. This technique contains a low operating cost and finds its application in remote areas and additionally reduces man power.

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