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Remote monitoring of solar photovoltaic panel using gsm and iot

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Description

In this paper, a method for remote monitoring and analysing of photovoltaic panels using IoT is illustrated. Photovoltaic panel is a device which converts light energy into electricity. The proposed design is used for remote monitoring based on current, voltage, temperatue and humidity measurement and alerting at the time of fault. The transmission among the photovoltaic panels and server is performed by IoT Internet of Things.The current, voltage, temperature and humidity data are processed by Microcontroller unit MCU .The measured data are transferred to hosting server using wireless Transmission. At first, the light energy from photovoltaic cell is converted into electricity power. Then measuring the current, temperature, humidity and voltage using sensors. The value of current, temperature, humidity and voltage are monitored and sent to the Iot Module, then the Iot module stores the data.This system is more time efficient than existing methods for remote monitoring system for photovoltaic panels and it sends a message to user via sms at the time of abnormality fault in the system.

Solar energy is clean, abundant and an easily harnessed form of energy. Solar energy, although unreliable, is becoming more and more popular with advancement in technology and decreasing cost. With modern monitoring and control systems, these are becoming increasingly reliable sources of energy and in some years, might even replace conventional sources completely. Power generated from Solar PV installations is susceptible to changes due to changes in solar irradiance, temperature, weather conditions and many other factors. Monitoring of such installations is hence essential.

Solar Power

Monitoring of solar power plants are essential task for supplying healthy power to the consumers in this automated era. The experimental setup of conceptual system consists of solar panels, voltage transducer, temperature and humidity sensor DHT 11, Light dependent resistor, SIM900A GPRS module and Arduino Uno micro controller. Programming codes are developed on Arduino Software IDE and visualization of data is done with the help of messages. This system is capable of measuring voltage output, ambient temperature, light intensity, humidity and compares the data with previous databases and reference values and raising an alarm via a message in case of an abnormality, and sending the data to the user via GSM module.We can add more sensors to it that depends upon the need.

The paper named Remote Monitoring Of Solar Photovoltaic Using GSM And IOT is based on 8-bit microcontroller platform, Microchips ARDUINO UNO ATMEGA328.All the required sensors to give detailed view of field like temperature, humidity and any other required sensors can be added to the device. A GLCD Graphic Liquid Crystal Display is added to the device for all the sensors readings and settings which give a visual contact to the user.A GSM Global System for Mobile Communication link is established using GSM module i.e. SIM 900 with user's handset. The module is configured with the device which will send the details to the users as when required.All the sensors are connected to analog pins of Micro controller.Sensor reads the value from the field and send it to the micro controller. Micro controller converts it in to digital form stores it in their variables. All the time new value overwrites the existing value of sensors in variables and the same is displayed on LCD in details with high precision.

Remote system

The current largest photovoltaic power station in the world is the 850 MW Longyangxia DamSolar Park In general, Remote Monitoring Systems are designed to monitor large or complex systems such as Oil & Gas refineries, Power Plants, Network Operation centers, Airports, Spacecraft, Process Industries etc. with Programming Logic control PLC procedures. With reference to Remote Monitoring at the Solar Power Plants, keeping up the health of the Solar PV System is of paramount importance, and continuous monitoring is required. As most of the Solar PV Plants are installed in remote locations, the Operations & Maintenance O&M provider will need to use all ways and means to get firm information about the plant performance daily. The O&M provider usually will have a limited knowledge of the local weather conditions and the effect of the terrain on plant performance.

When the Generation goes down dips, their engineers monitoring personnel cannot step outside the control room always to know which part of the plant is under performing or if there are weather related changes within the plant in a large acreage set-up. Therefore, to bridge the information gap and to get seamless updates about plant performance, Remote Monitoring systems are very essential. Remote monitoring is possible even from a central office of the client or the O&M provider's Headquarters HQ in a different location, with proper authentication measures. The latter complements the efforts of the monitoring personnel at site and is more tweaked towards analysis of the data, as received. Predictive analytics is the way forward for organizations which have a matured O&M plant monitoring set up.

Irrespective of size of the plants, comprehensive monitoring is important for tracking yields at the plants minute by minute. The decision for the installation of a Solar power plant means that it is not only choosing an ecofriendly technology but also a long term source of income for the investor. Therefore, to aid this goal the monitoring systems should run uninterrupted at all the times. Monitoring the generation yields regularly provides vital piece of information in advance when the system performance is low or is likely to fail. Based on the measures, preventive maintenance can be carried out to enhance the performance and the health of the system or the maintenance schedules judiciously planned.

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