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Design and Implementation of Real time solar power energy monitoring system using IOT

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Abstract
Using the Internet of Things Technology for supervising solar power generation can greatly enhance the performance, monitoring and maintenance of the plant. With advancement of technologies the cost of renewable energy equipment is going down globally encouraging large scale solar plant installations. This massive scale of solar system deployment requires sophisticated systems for automation of the plant monitoring remotely using web based interfaces as majority of them are installed in inaccessible locations and thus unable to be monitored from a dedicated location. The Project is based on implementation of new cost effective methodology based on IoT to remotely monitoring a solar plant for performance evaluation. This will facilitate preventive maintenance, fault detection of the plant in addition to real time monitoring.
KEYWORDS : IoT (Internet of Things), Power Monitoring.

INTRODUCTION

Solar power plants need to be monitored for optimum power output. This helps retrieve efficient power output from power plants while monitoring for faulty solar panels, connections, and dust accumulated on panels lowering output and other such issues affecting solar performance. So here we propose an automated IOT based solar power monitoring system that allows for automated solar power monitoring from anywhere over the internet. We use ATmega controller based system to monitor solar panel parameters. Our system constantly monitors the solar panel and transmits the power output to IOT system over the internet. Here we use IOT Things peak to transmit solar power parameters over the internet to IOT Thing speak server. It now displays these parameters to the user using an effective GUI and also alerts user when the output falls below specific limits. This makes remotely monitoring of solar plants very easy and ensures best power output.

LITERATURE SURVEY

PAPER [1]:- Purusothaman, SRR Dhiwaakar,
In this paper the system propose about the focus is on the DG agents, grid agent and Mu agents. DG agents like the distributed energy resources (DERs), load, storage and the grid agents. The Mu agent acts as the communication channel between the DG agents to the higher level agents such as the control agent. The implementation of the system has been done using an Arduino microcontroller.

PAPER [2]:- Author Kabalci, Ersan, Alper Gorgun, and Yasin Kabalci
In this paper introduces An instant monitoring infrastructure of a renewable energy generation system that is constituted with a wind turbine and solar panel arrays. The monitoring platform is based on current and voltage measurements of each renewable source. The related values are measured with the developed sensing circuits and processed by an 18F4450 microcontroller of Microchip. The processed parameters are then transmitted to a personal computer (PC) over universal serial bus (USB) to be saved in a database and to observe the system instantly. The coded visual interface of monitoring software can manage the saved data to analyze daily, weekly and monthly values of each measurement separately.

PAPER [3]:- Jiju, K.
In this Paper describes the development of an online monitoring and control system for distributed Renewable Energy Sources (RES) based on Android platform. This method utilizes the Bluetooth interface of Android Tablet or Mobile phone, as a communication link for data exchange with digital hardware of Power Conditioning Unit (PCU).

PAPER [4]:- Goto, Yoshihiro, et
In this paper explained about an integrated system that manages and remotely monitors telecommunications power plants has been developed and has started operations. The system is used to operate and maintain more than 200,000 telecommunication power Plants, which including devices such as rectifiers, inverters, and UPSs, and air-conditioning plants installed in about 8,000 telecommunication buildings. Features of the system are the integrate the management and remote monitoring functions, into one system and improved user interfaces, which use information and communication technology such as web technology.

PROBLEM FORMULATION

The IoT allows objects to be sensed or controlled remotely over existing network infrastructure, creating opportunities for pure integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. This technology has many applications like solar cities, Smart villages, Micro grids and Solar Street lights and so on.

OBJECTIVES

1. The main objective of this proposed work is to Power of the system can be monitor using the current and voltage value sensed by the arduino.
2. The monitor of the solar energy system shows the power and energy usage.
3. This system helps to implement in smart grid for efficient usage.

RESEARCH METHODOLOGY / PLANNING WORK

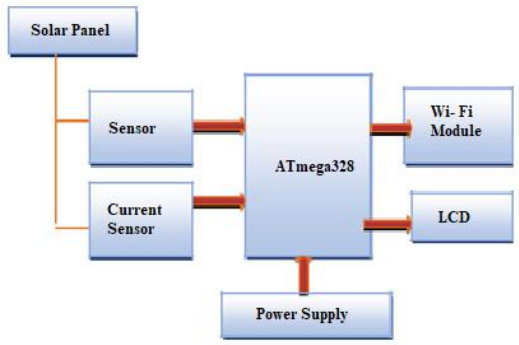


Fig. Block diagram of solar power energy monitoring system IOT

Through This Paper an IoT Based Solar Power Energy Monitoring System is developed. In which it monitors solar power energy monitoring over web server using internet. It now displays these parameters to the user using an effective GUI and also alerts user when the output falls below specific limits. This makes remotely monitoring of solar plants very easy and ensure best power output.
Solar power plants need to be monitored for optimum power output. This helps retrieve efficient power output from power plants while monitoring for faulty solar panels, connections, and dust accumulated on panels lowering output and other such issues affecting solar performance. So here we propose an automated IOT based solar power monitoring system that allows for automated solar power monitoring from anywhere over the internet. We use arduino based system to monitor a 10 Watt solar panel parameters. Our system constantly monitors the solar panel and transmits the power output to IOT system over the internet. Here we use IOT Gecko to transmit solar power parameters over the internet to IOT Gecko server.

FACILITIES REQUIRED FOR PROPOSED WORK

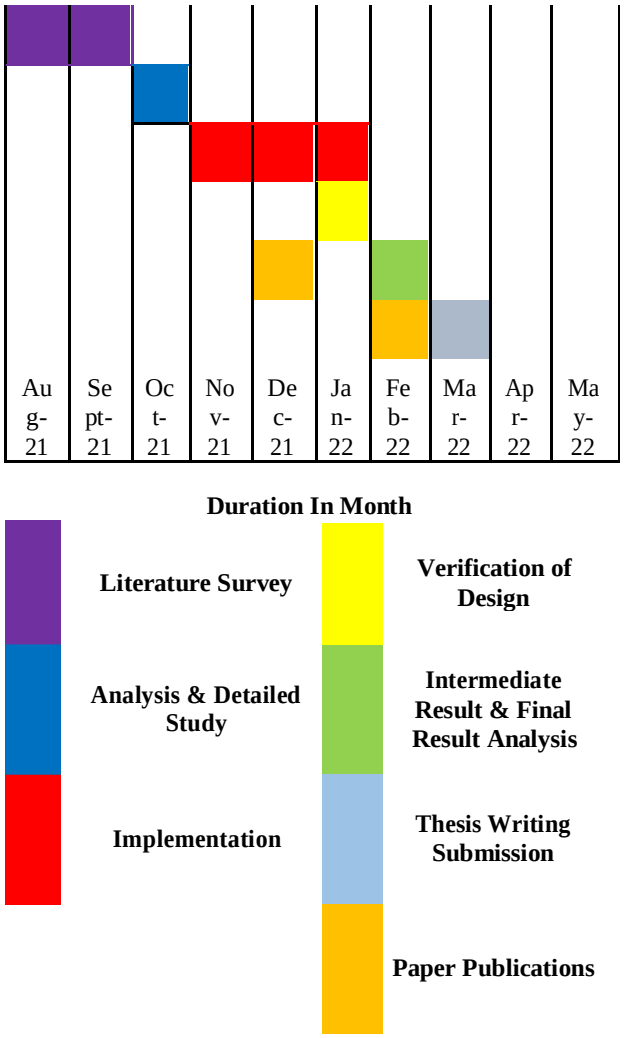
Hardware requirement

Module: Arduino Uno, LCD Module, Wi-Fi Module
Sensors: Voltage Sensor, Current Sensor

Software requirement

Operating system: Windows 7, Arduino UNO 3
Coding Language: Arduino IDE

PLAN OF RESEARCH: RESEARCH PLANNING



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