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A Paper on Solar Power Monitoring System Using IOT

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ABSTRACT:

Renewable energy sources are proven to be reliable and accepted as a good alternative for fulfilling our increasing energy requirement. The user can get the information about the current and previous average parameter like voltage, temperature, current and power saving. Solar photovoltaic energy is the new emerging and enticing clean technologies with zero carbon emission in today's world. This also provide the real time information to the user which will help to monitor the system the main purpose of this paper is that the solar panel can collect or we can say capture maximum solar radiation and maintain the system more reliably and good. To harness the solar power generation, it is indeed necessary to pay some serious attention to its maintenance as well as application. These IOT based technology is best suitable for remote like areas where solar Power plant are set up due to the large availability of solar energy but regular access to the areas is very much difficult and is not cost efficient.

KEYWORDS: Renewable energy, IOT, solar panel, battery, blynk application, voltage sensor, current sensor, power monitoring.

INTRODUCTION:

Power generation is very important factor in many developing countries. Due to the improvement of an industrial and commercial areas energy demand reaches higher levels hence almost all are poignant towards the renewable energy sources to produced green energy for meeting out our energy consumption. The monitoring system of the solar power plant cell is important to get the optimum output power. This efficient output of power plants while monitoring for connections, accumulation of dust or any other fault in solar panels affects the solar performance by lowering the 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 the Output to find the problem occurs in solar panel cell. In recent years there had been lot of researches attempted made in solar energy. A simpler forecasting database is modeled by the help of MySQL to collect the raw data filters un-relevant values monitored and produced the forecast without any assistance of the modern automation tools. In addition, machine intelligence techniques are used for forecasting to obtain robust performance Among this solar photovoltaic technology is been gaining popularity due to the huge availability, reduced cost, easy installation, and maintenance. Currently, Internet of Things is an evolving technology that make things smarter and user-friendly when connected through the communication protocol and cloud platform. In the modern life electricity became one of the most important and essential part of the life. for any work nowadays we required electricity like lighting, heating, refrigeration, cooling, transportation systems what not all the home appliance works on electric. The mechanically generated power is cheaper than compared with solar power to produce in large quantities due to of photovoltaic solar panels. In smaller locations where there is no commercial power solar energy becomes the source for the home and other things. They monitor the Solar panel and transmit the output to the IOT Thing speak transmits the solar power parameters in the Thing speak server. The parameters Is been displaying by using the help of GUI and when we get the output falls below the specified limit it will be alerts the users that there is some problem in the solar panel's cell connections or any dust particles on the solar panel cell we can say that, This makes the monitoring of solar panels easier and ensure best power and output. Proposed works

The main objective of this project is to get an optimum power output from the solar panels during dust is accumulated on it. Also, if there is any malfunctioning of the solar panels will be displayed on and we can also get information about whether the solar or battery connected for the loads. The system detects and alerts the user or the administrator when is fall below the predefine conditions, and display on the GUI. A solar panel is used that keeps monitoring the sunlight. Here different parameters like voltage, current and temperature are displayed on the LCD by using IOT technology. WI-FI MODULE All the calculated data from NODE-MCU ESP 8266 is further processed to Wi-Fi module These wi-fi module store the information in IoT server or Cloud In order to analyze the data on daily monthly and weakly basis.

Solar panel

The solar panel voltage and current is monitored with the help of sensors like current sensor and voltage sensor. The current sensor gives the value of current flowing through the solar panel and the voltage sensor gives the value of voltage appear across the solar panel. Both the sensor's data is given to ESP32 module which is combination of controller and wi-fi module. Solar panel is total of 12v. Solar panels are those type of devices which are used to absorb the Sun rays and convert them into Electricity. A solar panel is actually a collection of solar radiations, which can be used to generate electricity through photovoltaic effect Vol

ESP- 32 Module

ESP-32 module is a series of the low-cost, Low power system on a chip were microcontroller with integrated Wi-Fi and dual-mode Bluetooth. It is an all-rounded chip for the development of IOT projects and embedded systems in general. it's very reliable. ESP32 based boards are comes in a variety of shapes and sizes and also pinout of each board is different to other. Also, not all pins of the ESP32 Microcontroller SoC will be available on a development board as some pins might be permanently tied to a dedicated function.
one such cases is the flash memory, We know that all ESP32 boards come with 4 MB of Flash Memory to store the programs. so, some of the GPIO pins (6 to be specific) are connected by to SPI Flash IC and those pins cannot be used as regular GPIO Pins. Hence, it is very much important to understand the pinout of the popular ESP32 boards so that you will know what pins are available for use in projects.

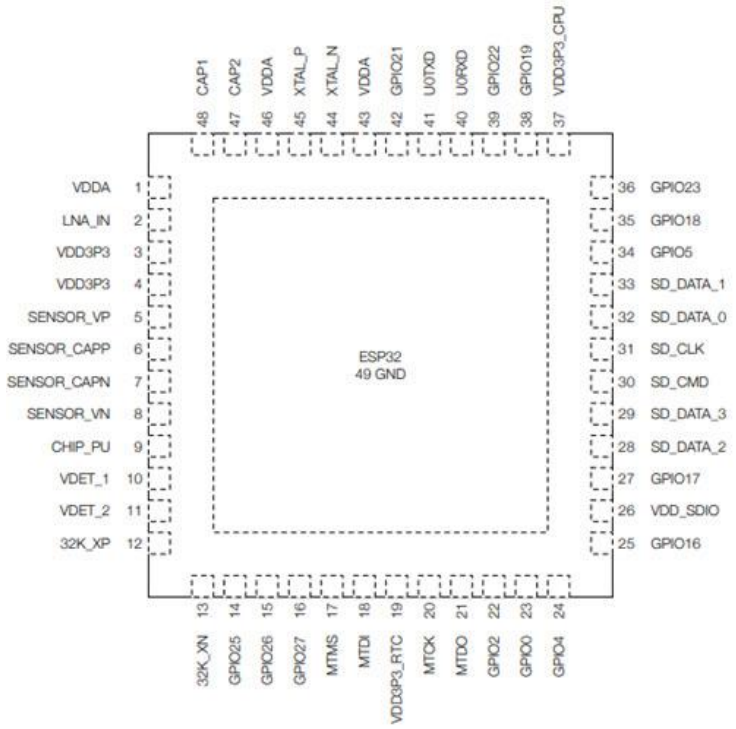

Fig. ESP-32 Pin Layout

LiteratureSurvey

1.The development of the monitoring online and the control of the system is based on the android platform by which wi-fi interface of the mobile phone as a communication link it creates data exchange with the hardware of power conditioning unit, by using and sensing circuits the value of the Current and Voltage Measurement of the Renewable Source is processed by the Micro Controller of the Macrochip, Then the parameter will Sent to the personal computer over USB and then system is observed instantly, the system is monitored daily and weekly and monthly.
2.Goto, Yeshihiro has briefly explained that the integrated system that monitors and manages has been developed and it has started operation. The System can be of operated and maintains the system above worth of the 200,000 of the Telecommunications Power Plants, which includes inverters, rectifiers and also air conditioning Plants, is installed above 8000 buildings to improve the user interface which use to communication technologies and the information of the Feature system and it integrate Management and remote monitoring functions into single system of installations.

CONCLUSION:

An IoT based virtual solar energy monitoring system is developed using a low-cost smart microcontroller. The cloud-based Blynk application shows the measured solar parameter in real time through mobile phone device. The monitored parameters shows the optimized result that is matches approximately with Electrical ratings of the solar module tested under Standard Test Condition (STC). The proposed work helps to predict the performance of the Solar PV module through remote access thing. This can be extended for the large scale Solar plant to take the preventive action by regularly monitoring and the performance of the Solar Plant. It will be highly useful for the industrial and commercial application.

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