SOLAR POWER MONITORING SYSTEM USING IOT

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ABSTRACT

This paper describes the monitoring of solar power by using internet of thing .The Internet of Things (IoT) refers to a system of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network without human intervention. These IoT based technology is best suited for remote areas where solar Power plant are set up due to the ample availability of solar energy but regular access to the areas is very difficult and is not cost efficient .These IoT based technology are comprises of Solar Panel, NODE-MCU ESP8266,Voltage Sensor, Current Sensor, Temperature Senor etc.

Keyword: *Solar Panel, IOT, Things speaker, Cloud Monitoring , NODE-MCU ESP8266*

1. 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 NODE-MCU ESP8266 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.

2. LITERATURE SURVEY

1. 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.

2. 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.

3. PROPOSE SYSTEM

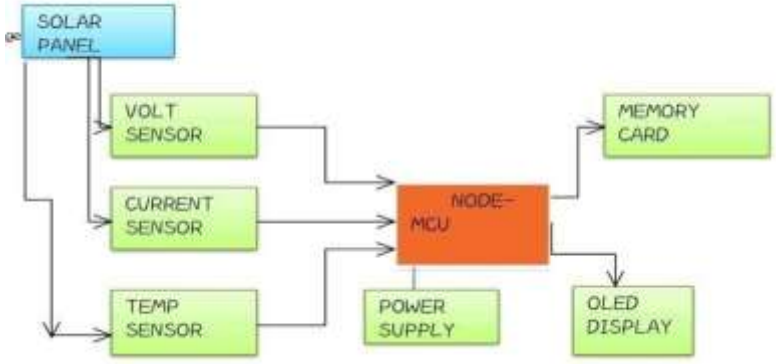


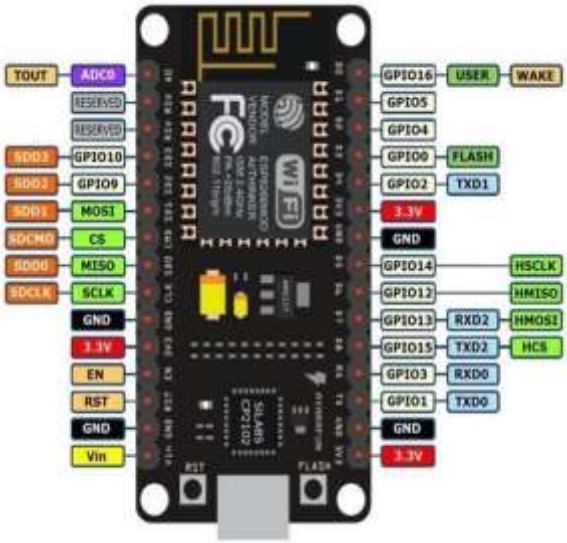
FIGURE 1-Block diagram of solar Power Monitoring System

3.1 SOLAR PANEL (20W)

In these project we use 20 w solar panel to measure current , voltage and temperature. The electricity generated by capturing the sunlight is called as solar energy which is use for industrial purposes and in domestic purpose also. These solar panel plays a very crucial role in these setup .It is the main organ of these project.

3.2 NODE-MCU ESP8266

The NODE-MCU act as a key processing elements in these proposed system which is developed by ESP8266 it is a one sort of microcontroller on single board that can be programmed using the NODE IDE. Having a operated voltage of 3.3 to 5 volts and it has inbuilt wife module system in it.



3.3 VOLTAGE(10.1V) AND CURRENT SENSOR(5A)

As 5 A is a current power sensor which gives the total power consumed by the load and gives respective reading .in digital form to NODE-MCU ESP 8266 .NODE-MCU ESP 8266 is with loaded programing help us to calculate the exact reading of current and voltage of connected inductive load .

3.4 TEMPERATURE SENSOR (NTC)

Negative temperature Coefficient (NTC)p/n 1600-10k works by translating temperature into resistance with Resistance decreasing as temperature increases .It has maximum temperature upto-150

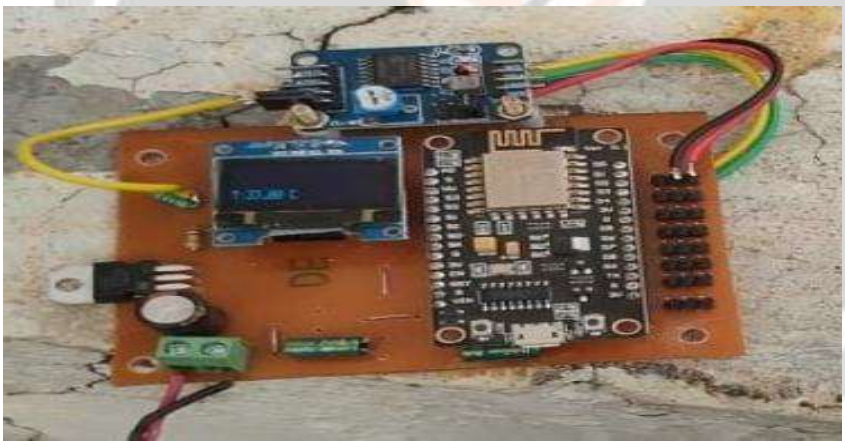
3.5. WI-FI MODULE

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 basic

3.6. ORGANIC LIGHT EMITTING DIODE (OLED)

OLED (Organic Light Emitting Diode) is a flat light emitting technology made by placing of thin film between two conductors display the IP address , voltage and current ratting and Temperature on OLED

3.7 SYSTEM IIMPLEMENTATION

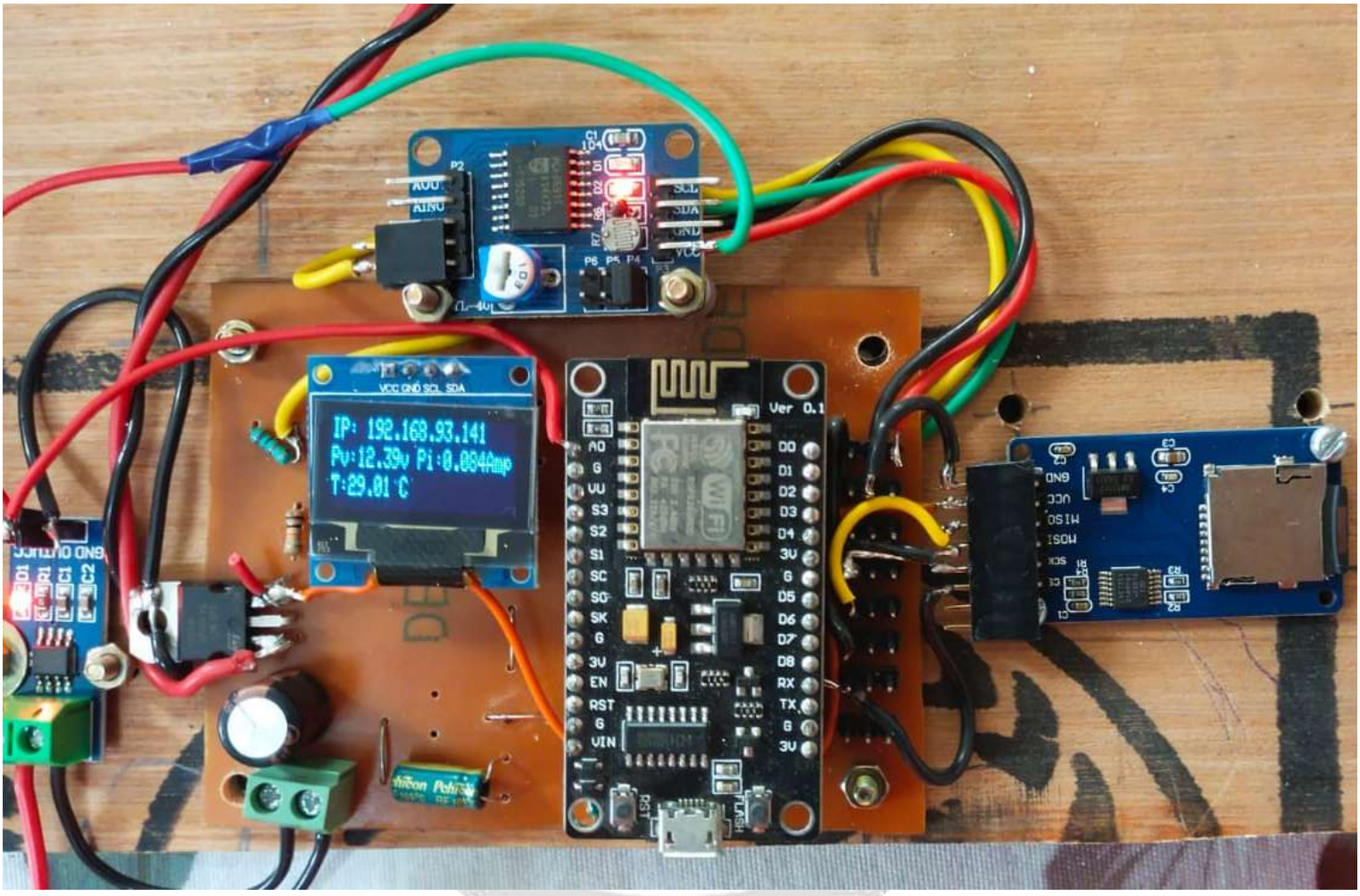


4. HOW DOES IT WORKS

In these project we use 20 W solar panel the output of solar panel is feed to the different sensors like voltage sensor ,current sensor and temperature sensor .These sensors are used to read the analog signal coming from the solar panel and theses analog signal is feed to the microcontroller ie., Node-MCU ESP8266 .In these microcontroller we have only one analog pin but there is requirement for more no of pin so we need a ADC(Analog to Digital Convert)i.e.,PCF8591 is a single chip and single supply low power data acquisition system has 4 analog pins inputs and 1 analog output pins. Digital signal coming from microcontroller is easy to access in our digital gadgets with help of in built wife module in our microcontroller. And we can also see the information or parameter in our OLED display. Their is also memory card to store the data and regain after any interval of time

5. RESULT

Here we are able to see our readings in OLED display screen where we can found IP address, voltage rating, current rating and temperature rating



6. CONCLUSION

These method has continues tracking of solar energy weekly, monthly and daily basis .The analysis became more simple and convenient and economically aditional .Non conventional energy which can be endlessly relished by process .The solar array voltage generation is one of the most higher solutions for clean energy production by observation and controlling the voltage generated by our planned system we have tendency to might overcome the drawback of earlier proposed system .This technique contain a low operating cost and find its application in remote areas and additionally reduces man power.

7. FUTURE SCOPE

Since these system requires external power supply of 5v and 3.3v for operation which can be taken rid of by utilizing the power generated by solar panel only .Also with the help of motor and controlling it is possible to track the sun for better power generation .Apart from that by using various Machine Learning algorithm and model it is possible to make system smart enough to take decision about data and performance.

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