THE UNIVERSITY OF FAISALABAD

IOT Based Solar Power Monitoring System

INTRODUCTION

The Internet of Things (IoT) is a system of related computing devices, digital and mechanical machines, objects, people with unique identifiers and potential transfer of data over a network without human-to-human or human-to computer interaction. Physical objects those are no longer disconnected from the virtual world, but can be controlled remotely through Internet services.

According to the International Energy Agency (IEA), Renewable energy will be the fastest-growing source of electricity, in which wind and solar PV are technologically mature and economically affordable.

In Pakistan, frequent power cut is very common. Due to this issue, it is important to use renewable energy and monitoring it. By monitoring the energy forecast, households and communities who are using solar power can utilize their energy production and consumption during good weather.

PROBLEM STATEMENT

Power generation from Solar Photovoltaic plants is variable in nature due to changes in solar irradiance, temperature and other factors. Thus remote monitoring is essential. For developing remote monitoring system for solar photovoltaic power plant, IoT (Internet of Things) approach is taken in this work which actually envisions a near future where everyday objects will be armed with microcontrollers and transceivers for digital communication.

Prevalent monitoring PV system approaches present poses some problems like low automaticity and poor real-time. These problems can be averted with an efficient remote environment information monitoring and controlling system.

OBJECTIVES

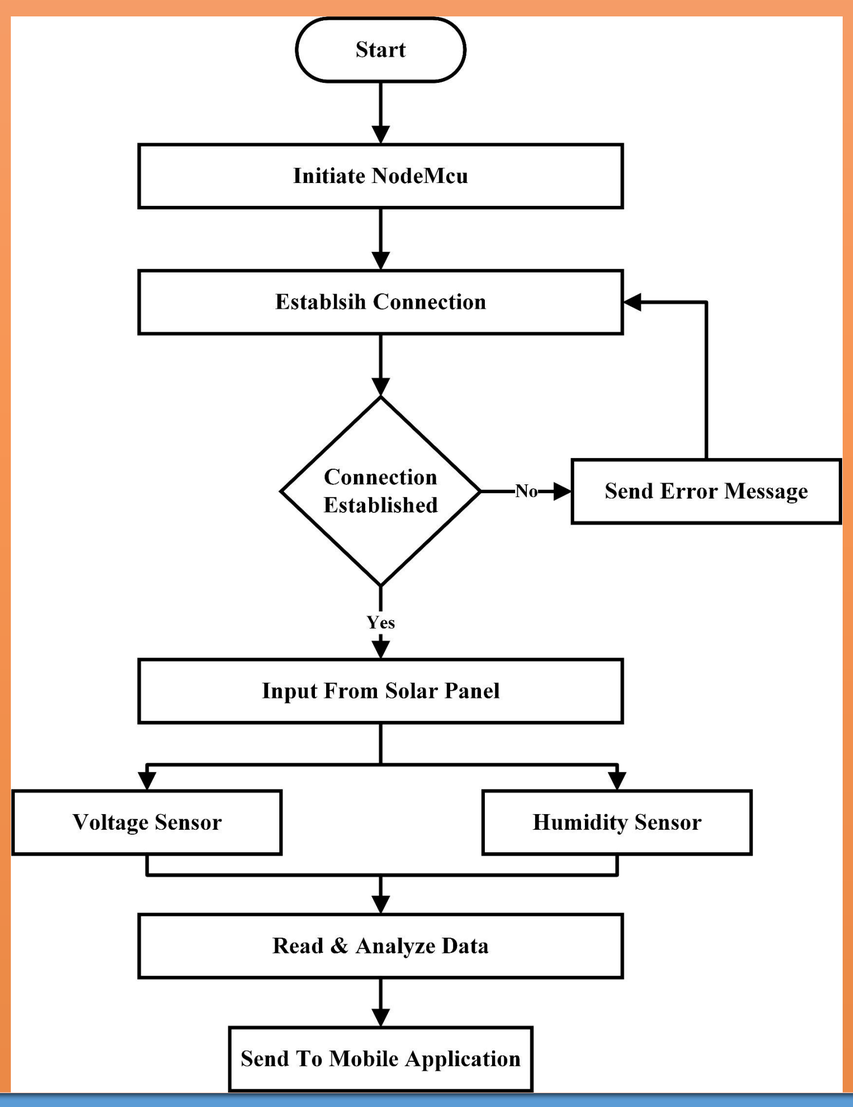
The objectives of this project are as follows:

- Optimum power from solar PV
- Monitoring Voltage, Temperature, and humidity levels
- State of voltage (SoV)
- Link with online server
- Human-machine interfacing

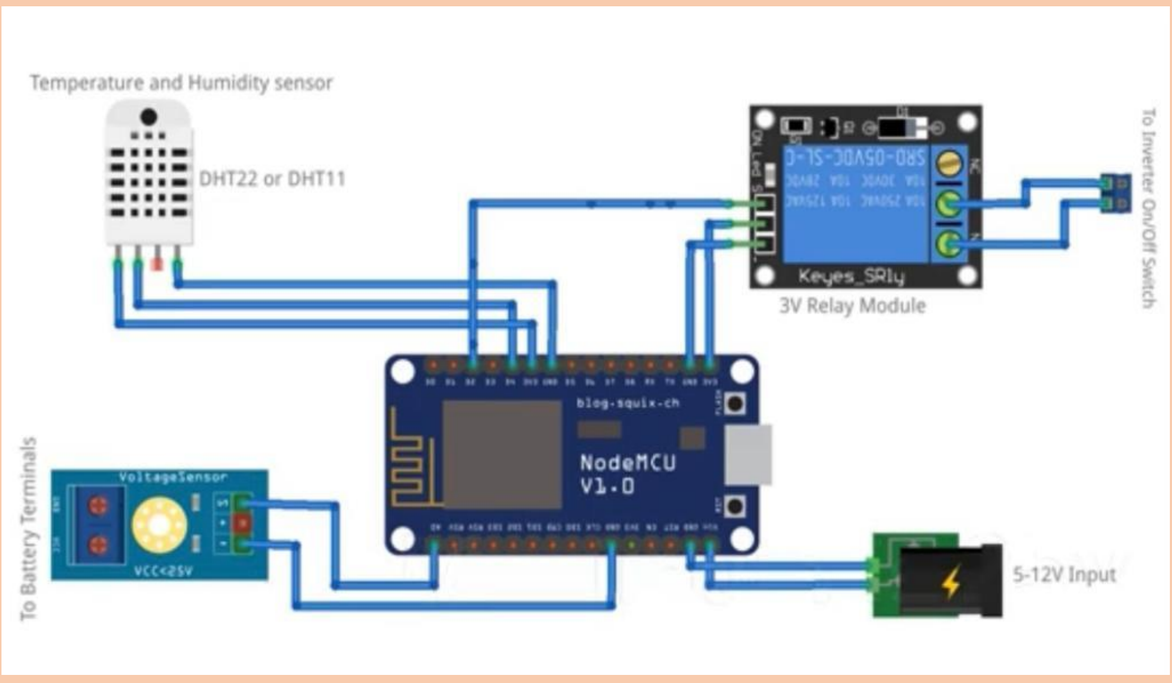
METHODOLOGY

Methodology consist of following stages:

- Hardware designing
- 3D printed hardware box
- Using voltage divider to reduce battery voltage for NodeMcu
- Interfacing with mobile application

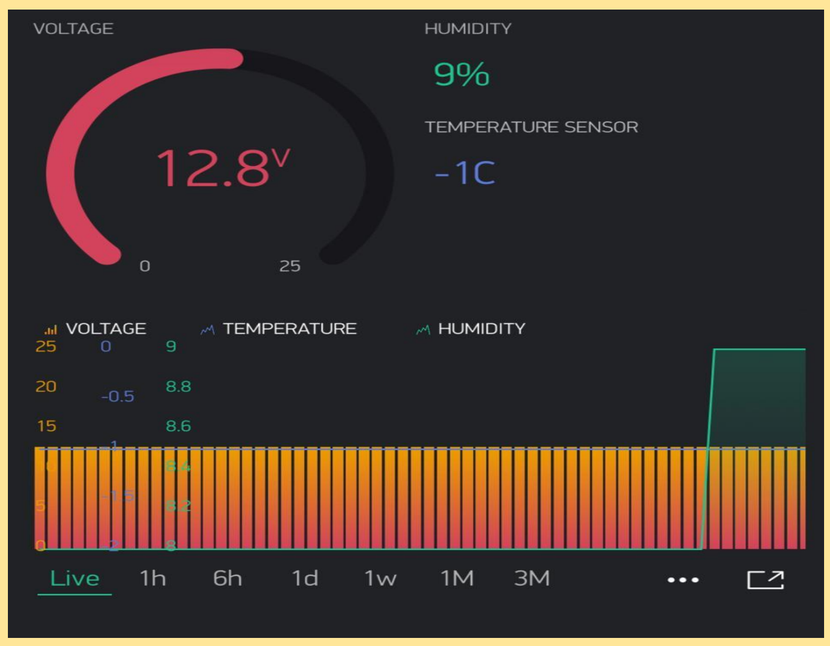


CIRCUIT DIAGRAM/ SCHEMATICS



RESULTS AND DISCUSSION

- The required parameters can be seen online.
- The measured values and the values seen online matched well.



FUTURE WORK

- This project can be further enhanced, by using the results of this current project, i.e. the monitored values obtained are helpful in predicting the future values of the parameters considered.
- Prediction of the amount of solar energy will be stored in the battery. The data stored in cloud can also be analyzed using the MATLAB.
- The web application can be developed for interaction with the end user; the user can also predict values of the future events.
- During the prediction two or more models can be used for same dataset, to find the accuracy of each model.

CONCLUSIONS

Use of IoT for monitoring of a solar power is an important step as day by day renewable energy sources are getting integrated into utility grid. Thus automation and intellectualization of solar power plant monitoring will enhance future decision making process for large scale solar power plant and grid integration of such plants. In this project we proposed an IoT based remote monitoring system for solar power plant, the approach is studied, implemented and successfully achieved the remote transmission of data to a server for supervision. IoT based remote monitoring will improve energy efficiency.

REFERENCES

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