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Portable Solar Powered Weather Station for Farmers

V. C. Nimkar[1*], P. P. Pawar[2]

[1*]*Assistant Professor, Department Of Information Technology, Changu Kana Thakur Arts, Commerce and Science College, New Panvel Email:-vinit.nimkar@gmail.com*
[2]*Assistant Professor, Department Of Information Technology, Changu Kana Thakur Arts, Commerce and Science College, New Panvel Email:-pravin6191@gmail.com*

[*]***Corresponding Author:*** *V .C. Nimkar*
[*]*Assistant Professor, Department Of Information Technology, Changu Kana Thakur Arts, Commerce and Science College, New Panvel Email:-vinit.nimkar@gmail.com*

Abstract

In this paper we have proposed a design which functions as a completely solar powered wireless weather station. The model is developed in such a way that it can be operated remotely and the output reading values are displayed on an easy to read LCD display with numeric values. The weather station is completely wireless as it incorporates a remote station with sensors to keep track of the weather powered by a solar panel and a base station to record and read weather data and in true terms to make it wireless. Base station can relay weather data as well as values to the hand held devices via internet. The remote station consists of sensors to measure rainfall, temperature and relative humidity level which are important weather parameters for our farmer friends with a design to optimize cost and power.

Keywords-Solar, wireless, weather, sensors, internet.

1 INTRODUCTION

To produce maximum agricultural harvest or output for competent planning in agriculture weather forecasting is very important. So, farmers of our country are always keen to know weather forecast and expect it to be accurate. Hence it becomes difficult task to predict or forecast a phenomenon like weather which is so diversified and never constant according to time or location. Farmers have to rely on techniques like past patterns of weather or generalized forecast which is focused on a larger region.
According To Annual Report (2021-2022) Of Department Of Agriculture & Farmers Welfareagriculture Plays A Vital Role In India's Economy. 54.6 Percent Of The Total Workforce Is Engaged In Agriculture And Allied Sector Activities (Census 2011) And Accounts For 18.8% (First Advance Estimates) Of Country's Gross Value Added (Gva) For The Year 2021-22 (At Current Prices) [1]. 61.60% Of The Population In Our Country Is Dependent On Agriculture And Related Field As An Occupation. Agriculture Or Crop Harvesting Is Majorly Dependent On Weather Specially Monsoon For Water Which Is Important For Perpetuating Crop Life. As Only 35% Of The Total Agricultural Land In India Is Dependent On Irrigation, So The Farmers Of Our Country Are Always Interested In Weather Forecast. Majority Of The Farmers Of Our Country Are Staying In Remote Rural Areas And Have To Rely On News Updates On Television, Newspaper For Weather Updates. Our Proposed System Focuses On Easy Accessibility Of Weather Forecast To The Farmers With Improved Accuracy By Forecasting Weather Of Local Environment.

2 SCOPE OF THE PROJECT

2.1 Problem statement

To produce maximum agricultural harvest or output for competent planning in agriculture weather forecasting is very important. So, farmers of our country are always keen to know weather forecast and expect it to be accurate. Hence it becomes difficult task to predict or forecast a phenomenon like weather which is so diversified and never constant according to time or location. Farmers have to rely on techniques like past patterns of weather or generalized forecast which is focused on a larger region.

2.2 Interdisciplinary relevance:

Weather forecasting is important for farmers to plan agricultural activities like ploughing, sowing, etc. Thus, even a slight inaccuracy in weather forecasting can negatively impact the agriculture or crop harvest. So, the conventional weather forecast through the weather forecasting station which is located far away from the local environment will not be able to forecast the weather accurately and which is not enough. Our proposed system focuses on more accurate weather fcasting for the farmers by not only providing them accurate weather forecasting system which is portable but also solar powered which would make it self-sufficient and also cost effective for the poor farmers of our country.

2.3Proposed Model

Our proposed weather station system in the paper is for farmers so the affordability of the system is of primary importance hence instead of using expensive and ultra modern sensors we have preferred using reasonably priced sensors but without compromising on the accuracy. Considering the problem of constant power outages in our country our proposed system is solar powered. second part of the project is NodeMCU for processing the data collected by sensors and its transmission wirelessly as well. Portability in our system is achieved because of Node MCU the output can be viewed on the LCD display and also can be transmitted remotely to the application on the mobile via networks. In our project among the various parameters of weather we have carefully selected parameters like Temprature and humidity and for sensing these parameters we have selected DHT11 sensor, rain sensor for detecting rainfall along with these sensors we have solar voltage sensor to sense the amount of voltage generated by solar panel.

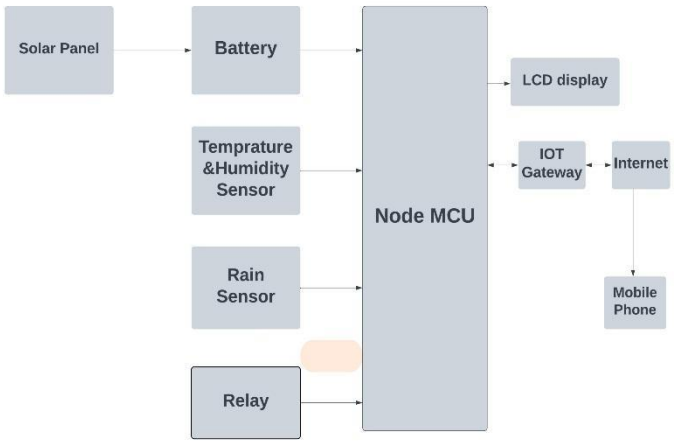

Figure1. Proposed block diagram

3 WORKING PRINCIPLE

We know the weather conditions Node MCU V2 will be in to capture weather readings. Temprature, Humidity, Rain sensors link with the Node MCU V2. The weather information in noticeable form is viewed on the LCD unit on the station itself aswell as transmitted to the software platform via WIFI transmitter. Sensors are carefully selected by us by following limitations.

1 Power Consumption: At the steady voltage of 5 VDC All the sensors function smoothly.
2 Accuracy: All the values collected by the sensor are accurate enough for the purpose (± 0.5°C of variations is expected because dampness in climate might affect the sensors)

3 Rigidness: The sensors can withstand and are reliable enough to function correctly in unfavourible weather conditions.

4 RESULTS

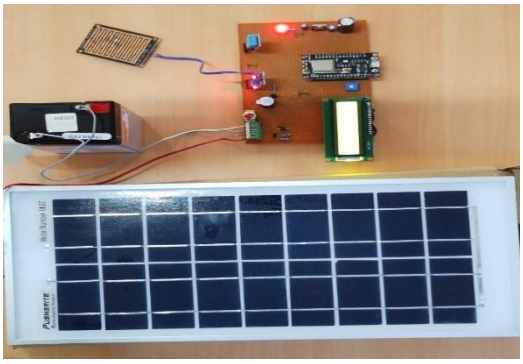

Figure 2. Hardware Setup

Figure 3. Display of output in LCD

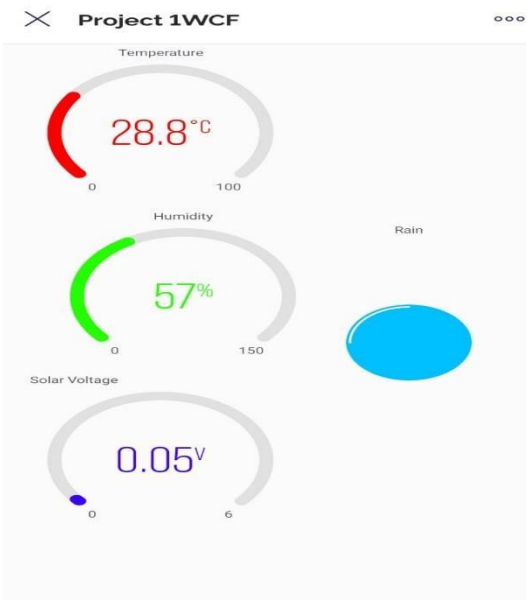

Figure 4. Display of output in software

Figure 2 shows the prototype of the hardware of the weather station monitoring system. different parameters measured in the weather station are displayed as output using LCD as shown in Figure 3. Output is also displayed on the software platform as shown in Figure 4.

5 CONCLUSION

This paper displays a simple yet cost effective and fairly accurate weather station for the farmers. This system is categorically designed for farmers can be concluded on the basis of the facts that it has features such as solar powered, portable, cost effective componets used in it. This system is designed keeping several difficuilties faced by farmers about weather forecasting in mind. System is seamlessly designed to collect values from the sensors and display it on the LCD in a simple and readable format. Use of Node MCU in the system has given

us added advantage in terms of portability as the values from the sensors can be viewed on the software platform from the remote location. The system has been designed with utmost care and minute details in mind.

6. References

1. IOT BASED WEATHER STATION MONITORING SYSTEM FOR SOLAR POWER PLANT Udayamoorthy Venkateshkumar*, C.S.R.Kavin*, S.Krishnan, N.Jagadesh
2. Ersankabalci, Alpergorgun, Yasinkabalci "Design and Implement at ion of a Renewable Energy Monitoring System" 4th International Conference on Power.
3. Marcos Afonso, Pedro Pereira, And João Martins "Weather Monitoring System for Renewable Energy Power Production Correlation" Ifip International Federation for Information Processing 2011.
4. S. H. Parvez, J. K. Saha, M.J. Hessian, H. Hussain, Md. M. A. Ghuri" A Novel Design and Implementation of Electronic Weather Station and Weather Data Transmission System Using GSM Network "seas Transaction on Circuits and Systems 2016.