International Journal of Advanced Technology in Engineering and Science
Vol. No.5, Issue No. 04, April 2017
www.ijates.com
ijates
ISSN 2348 - 7550

MEASUREMENT OF WEATHER PARAMETERS OVER INTERNET USING ARDUINO UNO BOARD

B.Anusha[1], K.V.D.Gayatri[2], G.V.Ravali[3], M.Satya Prasanna[4]

T.Manikyala Rao[5]

[1,2,3,4]Electronics and Communications, Sri Sivani College of Engineering (India)

[5]Associate Professor, Electronics and Communications, Sri Sivani College of Engineering, India)

ABSTRACT

In this IOT project we are going to monitor temperature and humidity over internet using thingspeak server. The measurements of temperature, atmospheric pressure and relative humidity remotely by using the appropriate sensors is not only important in environmental or weather monitoring but also crucial for many industrial process.A device for weather monitoring has been developed as described in this project to monitor and display the temperature, pressure and relative humidity, altitude of the atmosphere ,rain fall detection using Ardunio.Various techniques are used to monitor the weather like satellites, radars, microcontrollers and many other simple instruments. Weather can also be monitored by using remote wireless sensors.

"Arduino is the simple and low cost weather monitoring technique"

Keywords: Arduinouno, internet of things,Arduinosoftware,Weather sensors,ESP8266.

I INTRODUCTION

Weather forecasting is done using predicting the weather and values obtained from sensors or instruments. We human use an approach of algorithms having certain or no input and valid output. Considering there is nothing random in nature and everything around us follows a particular pattern. On the basis of these weather forecasting patterns people can take precautions on even harsh weather conditions. The wireless arduino weather station has a capability of working on low power. Hence it is not much dependent on power source. The device is also made of low cost items and around ±1 unit error accuracy. As an application, a normal person can place this device at various places like in his backyard garden for soil moisture and rain water readings, indoor swimming pool for the maintenance of water temperature and humidity in air. This weather has an external feature of a website access all around the world. It attempts to show live feed of readings from that environment where the result is required.

Working Principle

Fig1.Block diagram of weather monitoring using arduino

The device works by taking readings from various sensors at different pins in arduino microcontroller. For this purpose we've used an arduino compatible WiFi shield stacked upon our arduino microcontroller which adds up extra functionality to our arduino board. It increases the scope of this project. The various sensors are attached to the microcontroller each of them taking 5V input from arduino except one pressure sensor requiring 3.3V using a 3.3V pin out from the board. All the sensors are connected using a breadboard. For temperature sensor to prevent any damage or unstable behavior a 10kΩ resistor is attached in parallel to the temperature sensor on the breadboard. We've used DHT11 temperature sensor to get the temperature and humidity readings connected to digital pin 7 on board for input signals. It gives us continuous reading of surrounding environment in the range of two to three seconds. A raindrop sensor module is also attached from analog pin on arduino to take input signals from the sensor. The sensor detects either there is any rain or not in terms of values. The other part of the system is wireless connectivity. We've attached a ESP8266 wifi module over the arduino to connect it to the local internet connection providers and connect. Its job is to transmit the data to a website linked to it and visualize the data over there for every minute or thirty seconds. Since it is a module and not a breakout board we don't have to make particular connections for each of IRQ, VBAT and CS. It makes our circuit less wired and neat. It has its own mac address and transmit to the web server. There are many benefits of using this module over other wifi circuit modules present there in market as it can accept DNS where others require IP address as well as good circuit components and inbuilt antenna. It also has great libraries and support all around the world.

The website for this project is an open source IOT(Internet of Things) website named Thingspeak by a community of Mathworks. So it provides further facility to add code in Matlab and various function to get knowledge from theinformation obtained from the readings on the server. The website provides its DNS. On the Thing speak website, the first step is to register for the account. After registration, create a channel which will be for your device. A channel is made for taking all the information you want to display update send or receive. It is used for interaction between arduino and your channel. While creating the channel, specify or check the number of fields for data you want to visualize or post on the server. Thingspeak website provide API write key and API read key for each of its own purpose. In order to send or update information regarding our device in live feed we will use API write key and specify in our code while making requests to the website.

II. COMPONENTS

Arduino is an open source device, a prototyping board consisting of ATmega328Pmicrocontroller providing a 5V and 3.3V output volatage options. It takes input voltage from either connecting USB to your computer or either using a coaxial cable using a portable power supply. The arduino board is also capable of reading Twitter messages and respond in order to that. On the arduino you can upload sketches using Arduino IDE. Arduino comes in various flavours and according to needs like Uno, Mega, Yun etc. In this instrument I've used Arduino uno board. It is cheap and feasible. Also it is good to start as a beginner. It has 14 digital input/output pins, 6 analog inputs and a reset button. It takes input voltage in between 7-12V.

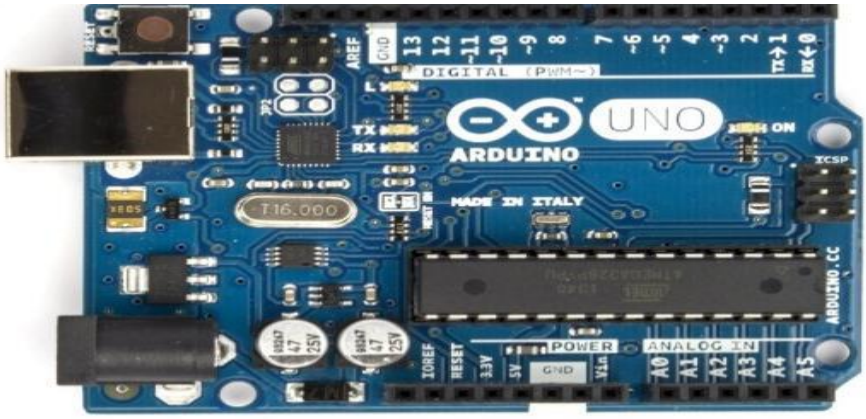

Fig2.Arduino uno Board

Wi -Fi module(ESP8266):

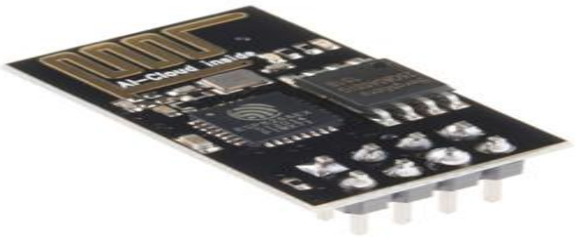

Fig3.Wifi module

Here we used ESP8266 Wi-Fi module which is having TCP/IP protocol stack integrated on chip. So that it can provide any microcontroller to get connected with Wi-Fi network. ESP8266 is a preprogrammed SOC and any microcontroller has to communicate with it through UART interface. It works with a supply voltage of 3.3v. The module is configured with AT commands and the microcontroller should be programmed to send the AT commands in a required sequence to configure the module in client mode. The module can be used in both client and server modes.

DHT11

DHT11 is a basic low cost temperature and humidity sensor. In this project we've connected DHT11 sensor to the digital pin 7 of arduino. It consists of 4 pins from left to right Vcc, Data, NC(not connected) and GND. There are mainly three pins which are used. Connecting the ground on ground of arduino and Vcc to 5v output of arduino.

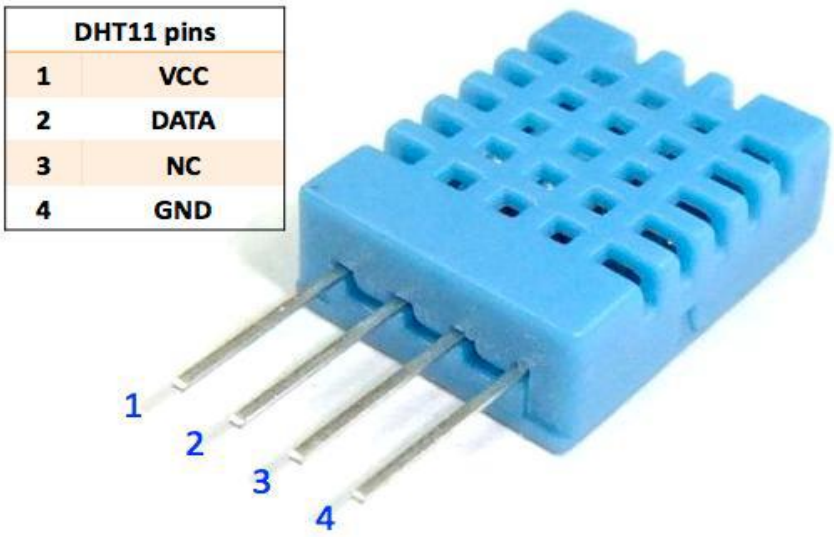

Fig4. DHT11 sensor

III. RESULTS:

Thingspeak is an open data platform for the Internet of Things. It sends data to the cloud. Using this we can analyze and visualize our data. Finally on the basis of those we can react or trigger an action. It provides real time data collection and other devices an technologies like Particle Photon, Raspberry Pi, Twitter, Electric Imp etc.

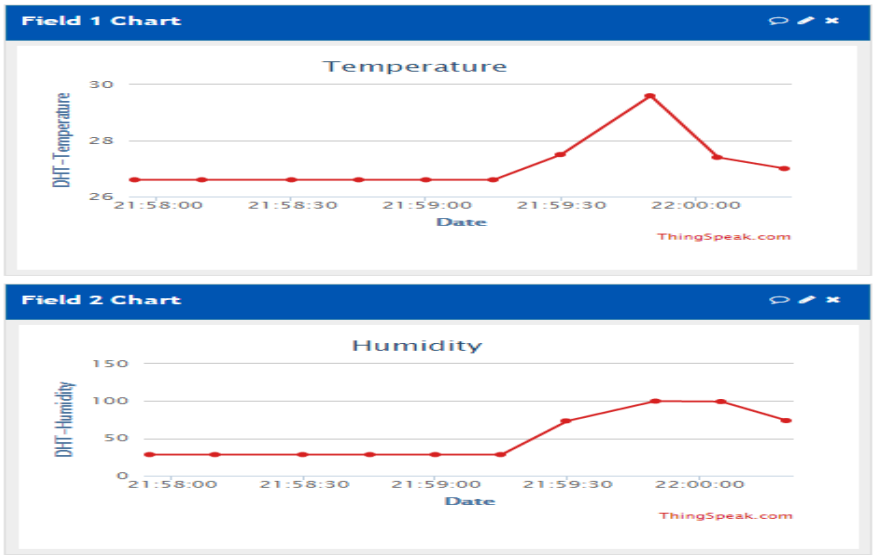

Fig5. Results of weather monitoring using Thing speak

IV CONCLUSION

The project deals with designing a simple and low cost weather monitoring system using dht11, LCD, ESP8266 and arduino of ATMEGA-32 microcontroller unit to monitor weather conditions of the desired location and transmit it to a thingspeak server at distant location through webpage. The designed product module is at prelim

stage and designed only for temperature monitoring but can be enhanced for monitoring other different type of environmental and climatic behavior of a location, which also can be cost effective.

V FUTURE SCOPE

Different other sensors as humidity sensor, light intensity sensor, pressure sensor can also be interfaced with the microcontroller to fetch various information about a location. Automatic irrigation control can also be implemented using moisture sensor to fetch data regarding water presence in the farm and do turn on or turn off water pump accordingly. Trespassing can be monitored developing surveillance system using infrared sensors and pressure sensors.

REFERENCES

[1] International Journal of Engineering Trends and Technology (IJETT) – Volume 33 - March 2016'An Automated ThingSpeak .

[2] SMS based Weather report information system.

[3] Keshavkumar Singh Design of wireless weather monitoring system.

[4] P.Susmitha Dept. of ECM K L UNIVERSITY Guntur (Dt), India, G.Sowmyabala Assistant Professor Dept. of ECM K L University, India Design and Implementation of Weather Monitoring and Controlling System.

[5] ZigBee based weather monitoring system by NishaGahlot, VarshaGundkal, SonaliKothimbire, ArchanaThite.

[6] Microcontroller based real time weather monitoring device with GSM.

[7] Nashwa El -Bendary, Mohamed Mostafa M. Fouad, Rabie A. Ramadan, Soumya Banerjee and Aboul Ella Hassanien, "Smart Environmental Monitoring Using Wireless Sensor Networks",K15146_C025.indd, 2013.

[8] Grzegorz Lehmann, Andreas Rieger, Marco Blumendorf, SahinAlbayrakDAI, "A 3-Layer Architecture for Smart Environment Models"/A model-based approach/Labor Technische University Berlin, Germany 978-1-4244-5328-3/10 © IEEE,2010.

[9] X. Meng, "ICA Algorithm Based on Intelligent Electronic Nose in the Mixed Gas of Feature Extraction," 6th International Conference on Wireless Communications Networking and Mobile Computing, 2010, pp. 1-4.

[10] Mohammad JavadManashti, HoushangGhamarnia, SoheilaAmirian, Ramin Mohammad Nezhad, "Design GSM-SMS based system for old structured greenhouses with monitoring and logging network sensors," International Research Journal of Applied and Basic Sciences, vol. 3, pp. 1497-1507, 2012.

[11] "Liquid-crystal display," wikipedia, [Online]. Available: https://en.wikipedia.org/wiki/Liquid-crystal_display.