



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 1, January 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.118

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

IOT Based Weather Monitoring System

Anita Choudhary¹, Dr. Rahul Pol²

U.G. Student, Department of Electronics Engineering, VIIT Engineering College, Kondhwa, Pune, India¹

Associate Professor, Department of Electronics Engineering, VIIT Engineering College, Kondhwa, Pune, India²

ABSTRACT:The system has been proposed for efficient monitoring of weather conditions. The project is based on Internet of things(IOT) domain,which helps to connect any devices to internet. Iot has become an innovative and growing sector worldwide. Iot is used in many sectors including agriculture,home automation,industry and health. In health sector we can use Iot to monitor patient health and thereby increasing productivity in hospitals.In agriculture sector sensors are used on plants, board machines and plants. We have used sensors to monitor weather conditions like pressure ,humidity, rainfall and humidity. A considerable amount of tools is used for its efficient working. Sensors such as pressure sensor,humidity sensor and rain sensor has been used. These sensors help to detect changes in weather conditions. We Interface sensors with nodemcu ESP8266-12E Wifi Module. Thingspeak platform has been used which shows the result with respective fields. Weather station is very helpful in agriculture sector. Analysis is made based on the data collected from the project. We can further upload this project on web, so that it becomes useful to concerned people anywhere in the world. It also provides an opportunity to control the system remotely. Iot has made every sector advanced, easy to manage and comfortable to use. In agriculture sector,this project will certainly prove useful during adverse weather conditions. This project completes our objective of making out of the box innovation.

KEYWORDS: Internet of Things (IoT), ThingsSpeak,weather monitoring,NodeMcu.

I. INTRODUCTION

Iot is the connection of wide range of objects and human through internet.It is considered as one of the powerful technology and also has its communication unlike technology like sigfox, RFID and bluetooth. Iot associates internet to different things and to accompolish the goal of fiinding and making innovative things. Iot is mainly used in every sector and has an enormous applications across every field.In near future,our day to day life will be associated with gadgets. Different types of Monitoring system can be made and analysis can be done for future endeavours.Experts thus construct analysisof atmospheric condition based on observed climatic condition. Iot is the base of innovative ideas and considered as financial wave across world. Embedded system allow the users to see the different types of field and store consecutive data in the platform like cloud. An efficient system is required to assess and take care of excedding level parameters such as noise, CO level. This weather monitoring system is easy to use , monitor and user friendly. When monitoring system is used with different software devices it becomes self sufficient making it known as smart system. Iot has the ability to break traditional methods and and improve consumer needs. It also adds to enhancement and quality living of humans. It has emerged as a modern technology. A study has been carried out to learn about challenges faced by models and building the project accordingly. Weather Station is important to mankind over many years. Weather parameters are used for weather prediction and analysis. Breadboard is used and blocks used are digital and analog sensors for acquiring environment data.Circuit setup is done with internet via 2.4 GHz Wifi Band.There is evolution in Iot with tremendous smart devices and their ability to share data. Iot proves advantageous in various fields and to store geographical data on cloud. We can also use wireless devices and make various monitoring system.Further, there are many studies related to monitoring system using iot worldwide.Also to enhance the project we can also use soil moisture sensor.The paper focuses on new paradigm for future environmental monitoring.The main aim is to predict the time and weather parameters without human intervention and errors. The project focuses on small area and in adverse weather conditions it has some limitations. The maintenance is also high and we cannot plot it on large scale.We can use the system for many years in small area.Instead of thingspeak we can also use LCD screento display readings of the parameters.Users can make a weather map for a specific region in no time .Present weather conditions are used to predict future conditions. Once we start monitoring there are certain patterns that we observe and those are called recognition patterns. The main aim was to add this project in smart cities plan.The main features of this system includes realiable meteorological data, flexible scability and convenient deployment. Wifi module is used and data is displayed on thingspeak website. We can make datasheet with the help of this project and we can upload it on

web.Arduino Ide is used for programming our nodemcu. The language used in arduino ide is C or C++. Software is open source and easy to use. Program written in arduino ide are called sketches. The extension with which the it is saved is .ino. Console displays the possible errors in program and output.

II. RELATED WORK

There are multiple ways to make user-friendly and automatic weather monitoring system . This system is made available on the internet to make advantage to humans. Weather parameters are used to make predictions and assess the condition of the weather. There are various available work on this system. Our system was inspired by the method used by the S.Kumari who build the prototype of monitoring system with earthquake detection. Our proposed work does not include earthquake detection. Another monitoring system built by the author Sohail Shaikh inspired us to build this system.

III. METHODOLOGY

The methodology of project is divided into two parts which are hardware and software part. The hardware expansion involves the circuit building and thereby developing the prototype of model. Meanwhile, the software part includes the IoT coding part, circuit diagram, simulation of circuit and data collection. This project uses thing speak platform to show the data obtained from the sensor. We are using three types of sensor to monitor the weather parameters online with the help of arduino Ide. First, we assemble all system requirement tools and build them as per circuit diagram. Then we Program the nodemcu board using Arduino Ide. We also connect esp8266 with mobile through hotspot connection and you can see the esp name in your connected devices list. We connect all the three sensors BMP180 , DHT11 and Rain Sensor to nodemcu on breadboard. With the use of these three sensors, we can collect the required data for monitoring purpose. The data is streamed over the Internet to display and read it from anywhere. After the hardware is programmed successfully, the NodeMCU gets IP address. We display the data fetched by sensors in GUI format. The weather parameters are temperature, pressure, humidity and rain. Also, anyone can check weather data anywhere using Internet as server is hosted publicly. We connect all the three sensors on breadboard with the help of jumper wires with nodemcu. The analysis is done in the cloud for prediction purposes. The sensor data is then sent to the thingspeak website and displayed.. The data collected is analysed to configure the condition . The analysis done using the data can help the user to determine the weather state and tell them about the quality of rain and check if it is hazardous. Controlling is done by ESP8266 and monitoring by Nodemcu. Thingspeak allows to add multiple fields and enables us with api key. In coding part we add wifi connection details including username and password,. Objects and variables are created for temperature and humidity sensor. Specific libraries are included for the sensors to build connection and send data. Conditions are added within the loops for humidity and temperature sensor.

IV. EXPERIMENTAL RESULTS

When the connection is established the data is sent to the web server. ESP8266 microcontroller takes care of all weather parameters to be monitored. System is powered by USB cable and later the code is uploaded in ESP8266 microcontroller. The data received from sensor can be displayed in Serial Monitor. Esp is connected with the WiFi hotspot so that the connection is established between sensor and weather station and the sensor data is displayed on web server.(i.e ThingSpeak). We can see all the weather parameters on thingspeak like temperature, humidity, rainfall and pressure with this embedded monitoring system. The objective is completed successfully and primary environment factors are checked making this model helpful for farmers. The web server includes html which displays sensor data by coding and connection with use of IP address of the ESP8266. It reads all the sensor values and sends it to the cloud. ThingSpeak stores the sensor value and data is displayed on the channel.

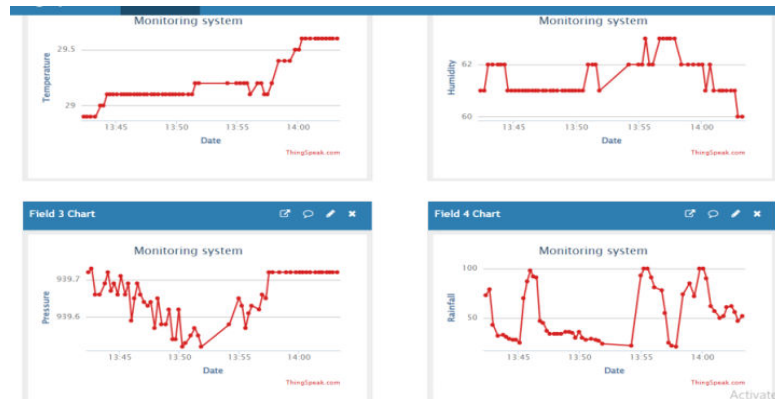


Fig. 1. Readings of all temperature parameters displayed on thingspeak website.

V. CONCLUSION

We have concluded that the system would work efficiently if projected to industry level. Weather station works very smoothly in day time in comparison with night time. Accuracy of the proposed project is 95% with appropriate readings on website. Thingspeak website provides desired results of the project and pattern followed in project helps us in understanding future weather conditions. The data is made available online so that it can be accessed by anyone and people can analyze certain patterns in climate. This system can be used for meteorological purposes. By using sensors we can flow real time data using ESP8266 over web server. We required one public IP to make this data available on the web. Proposed system uses a combination of analog and digital sensors in wireless and wired communication. Monitoring system is low cost and can be served for appropriate purposes.

REFERENCES

- [1] Dhanalaxmi, B., & Naidu, G. A. (2017, February). A survey on design and analysis of robust IoT architecture. In 2017 International Conference on Innovative Mechanisms for Industry Applications (ICIMIA) (pp. 375-378). IEEE.
- [2] Krishnamurthi, K., Thapa, S., Kothari, L., & Prakash, A. (2015). Arduino based weather monitoring system. *International Journal of Engineering Research and General Science*, 3(2), 452-458.
- [3] Sabharwal, N., Kumar, R., Thakur, A., & Sharma, J. (2014). A Low-Cost Zigbee Based automatic Wireless Weather Station With Gui And Web Hosting Facility. *International Journal of Electrical and Electronics Engineering*,
- [4] Mahmood, S. N., & Hasan, F. F. (2017). Design of weather monitoring system using Arduino based database implementation. *Journal of Multidisciplinary Engineering Science and Technology (JMEST)*, 4(4), 7109.
- [5] Yachirema, D. C., Palau, C. E., & Esteve, M. (2017, January). Enable IoT interoperability in ambient assisted living: Active and healthy ageing scenarios. In 2017 14th IEEE Annual Consumer Communications & Networking Conference (CCNC) (pp. 53-58). IEEE.
- [6] Pan, J., Jain, R., Paul, S., Vu, T., Saifullah, A., & Sha, M. (2015). An internet of things framework for smart energy in buildings: designs, prototype, and experiments. *IEEE Internet of Things Journal*, 2(6), 527-537.
- [7] Gahlot, N., Gundkal, V., Kothimbire, S., & Thite, A. (2015). Zigbee based weather monitoring system. *The International Journal of Engineering and Science*, 4, 61-66.
- [8] Mahmood, S. N., Abdulabbas, A., Easa, H., & Algburi, S. S. (2017, April). The battery characteristics impact on solar systems: Performance and cost. In 2017 International Conference on Current Research in Computer Science and Information Technology (ICCIT) (pp. 151-156). IEEE.
- [9] Mahmood, S. N., Hussain, A. S. T., Easa, H. K., & Algburi, S. S. (2017, August). Wind turbine power evaluation based on performance and cost factors. In 2017 IEEE 3rd International Conference on Engineering Technologies and Social Sciences (ICETSS) (pp. 1-6). IEEE.
- [10] Hussain, A. S. T., & Mahmood, S. N. (2017, August). Hybrid power station act based on runoff river. In 2017 IEEE 3rd International Conference on Engineering Technologies and Social Sciences (ICETSS) (pp. 1-7). IEEE.



- [11] Vijay, Rampeesa, Thotakura Sainag, and A. Vamsee Krishna. "Smart Home Wireless Automation Technology using Arduino based on IOT." IJECT Journal 8, no. 4 (2017).
- [12] A Study on IoT Approach for Monitoring Water Quality Using MQTT Algorithm, Alfiya Abubaker¹, Kavya C R², Tilju Thomas³, Nikhil Joseph⁴, Shifana Begum⁵, 1,2,3,4 Final Year UG Students, Dept. of CSE, Srinivas School of Engineering, Mangalore
- [13] IoT Based Water Quality Monitoring System, Mourvika Shirode, Monika Adaling, Jyoti Biradar, Trupti Mate, Department of Electronics & Telecommunication Keystone School of Engineering, Pune, Maharashtra, India
- [14] <https://internetofthingsagenda.techtarget.com/definition/Internetof-Things-IoT>
- [15] Girija C Department of Electronics and Communication, NIEIT, Andreanna Grace Shires Department of Electronics and Communication, NIEIT, Mysuru Internet of Things (IoT) based Weather, International Journal of Engineering Research & Technology (IJERT)
- [16] Mobile APP & IoT Based Station Weather Station. AUTHOR: K. N. V. SATYANARAYANA, S. R. N. REDDY, K. N. V. SURESH VARMA & P. KANAKA RAJU
- [17] Arduino Based Weather Monitoring System. AUTHOR: Karthik Krishnamurthi, Suraj Thapa, Lokesh Kothari, Arun Prakash
- [18] Internet of Things (IoT) Based Weather Monitoring system, Bulipe Srinivas Rao¹, Prof. Dr K. Srinivasa Rao², Mr N. Ome³, international Journal of Advanced Research in Computer and Communication Engineering, ISO 3297:2007 Certified, Vol. 5, Issue 9, September 2016.



INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor: 8.118



ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



www.ijirset.com

Scan to save the contact details