International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 04 Issue: 05 | May -2017 www.irjet.net p-ISSN: 2395-0072

IOT Compatible Wireless Smart Portable Mini Weather Analyzer

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Abstract- *Measurement and Control of humidity & temperature play an important role in the fields like agriculture science ,Engineering & Technology . It become essential to monitor the load time weather condition of one place from another place . In this Paper we present the design & development of arduino based IoT for measuring humidity temperature & CO2 . MQ 135 sensor used for measuring CO2 in air. humidity ,temperature & CO2 measurements made in real-time are shown graphically .This information is received by specially designed application interface running on pc connected through Wi-Fi wireless link .The data generated will be in excel as well as in graphically form using LABVIEW software for analysis purpose. The Proposed system is also capable of generating short time alerts based on weather parameters. It gives an on-line & real-time effects. The idea behind this work is to monitor the weather facility & warn AMC from environment effect.*

Keywords: IOT, Wi-Fi, labview, arduino,ESP 8266,USB, intelligence node, portable.

1. INTRODUCTION

The Internet of Things (IoT) is a recent communication, in which a network connects all things to the internet for communicating through the sensing devices with suitable protocols, and exchange data with each other by using wireless sensor networks [1]. Using an IoT the device is connected to the internet and all the information is shared with other objects without human intervention. The IoT is meant to measure real-world events and controlling the specific phenomena. IoT gives the information in all sectors of agriculture, healthcare, home appliances, etc. With the increase in the number and functionalities of sensors and actuators, the IoT which interconnects a particular set of things, is easily programmable, and more capable of interacting with humans [2]. In India, weather forecasting systems use one system per 32km area. It is a lower resolution. A higher resolution is not so easy in India because of high cost constraints. When the more number of stations are there, it would be called as high resolution, which will result in higher accuracy of the weather forecasting. It is possible only when there exists a weather station with low budget and low maintenance charges [3]. In this proposed work we have developed and tested a completely automatic and wireless weather monitoring equipment which measures the parameters of the weather by low cost digital sensors. It communicates this data to a computer system via Wi-Fi wireless link. It has a facility to display the information in user friendly way, hosting it on internet and also it can log the data continuously whenever required.I have chosen my city Ahmedabad as test city to deploy my design to capture these data and use it in aiding authority to curb pollution issue. Drawback of the current pollution stations is that they were located in laboratories and at very distant places from each other. Moreover, being bulky in size they couldn't be installed at junction places where there was a dire need of monitoring the air. Hence, Ahmedabad Municipal Corporation took up the responsibility to install 10 Poll drones as a pilot project across the city to determine the pollution at key junction points.They began setting up digital sensors around the entire city area for measuring various weather parameters. We have also attempted to make a mathematical model which can generate the short time local alerts based on current values of parameters. We have used LABVIEW software platform and arduino hardware platform to achieve this objective.

2. OBJECTIVES

An IoT based system will provide easy installion, costless & maintance free for proposed system . The DHT sensor is used for measuring humidity & temperature. MQ 135 sensor used for measuring CO2 in air. humidity ,temperature & CO2 measurements made in real-time are shown graphically .This information is received by specially designed application interface running on pc connected through Wi-Fi wireless link .The data generated will be in excel as well as graphical form using LABVIEW software for analysis purpose.

3. FORMAL DEFINITION

After analizing the existing system and the following activities that are important in generating an accurate weather report with all the challenges taken into consideration in present scenario, it is still need to have accurate whether forecast system from authorized system .In such area there is great importance of having such device that are scalable,expandable and flexible to update. We are doing a small effort but having great impact in such direction. I have come up with an idea to design small portable battery operated ,temperature node which is itself having data storage, inbuilt USB , low cost and possible to connect with Wi-Fi and IOT (Internet of Things). I am planning to design a product to be put into market as my project.

4. PROPOSED TECHNIQUE

My job is to design a small, portable device for collecting weather report of various parameters. Out of a set of many parameters I have chosen humidity to begin with. I will be designing a device that just on plug-in into a laptop or PC would start collecting data off the environment around and generate reports in Excel format for further analysis and decision making.The supporting software includes LABVIEW and Excel for data capturing, collecting and analyzing. The entire process from commencement to conclusion will be designed by me leading me to ultimately develop a product to put into market for everyone to use and contribute in serving our gratitude towards Mother Nature.

5.PROPOSED MATHODOLOGY OF EVALUATION

The system is divided into fourmain parts, namely, the sensor circuit, the data-logging circuit, Wi-Fi and the USB interfacing circuit. USB interfacing circuit facilitates the data transfer between the data logger and a PC. The block diagram of the overall system is depicted in following block diagram. The device having compact size as for USB connection having a future modification by data logger and IOT compatible.

6. PROPOSED TOOLS TO BE USED

Proposed system will need DHT-11,wifi module, Battery, power supply,arduino nano and LABVIEW software.

7. BLOCK DIAGRAM

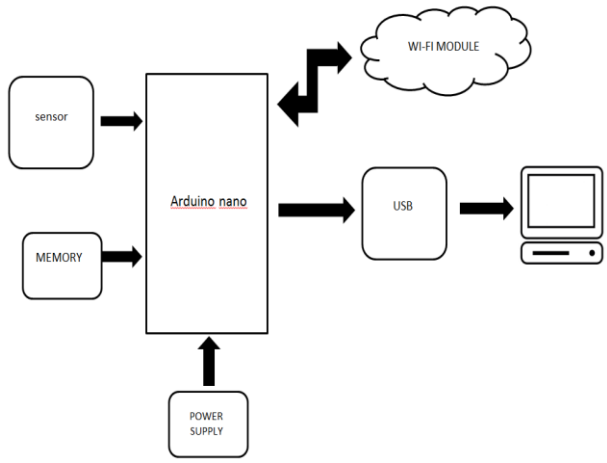

Fig 1. *Block diagram*

8. PROPOSED EXPERIMENTAL SET UP

The remote weather station measures the weather data and wirelessly transmits the weather data to the main weather station for display and logging. arduino the microcontroller used for this work, is the main controller on the remote station which interfaces with the sensor. It handles data acquisition and data transmission using the transmitter unit .Data transfer using USB and Wi-Fi network. in such area where Wi-Fi unavailable then we get data using USB. Power supply is given for the continue supply to the circuit and also given long life battery

9. EXPECTED

- **Observation**

After completing all the set-up, from starting of the test to the end of the test all the sensors working and data transmission will be observed. These sensors data reaches to microcontroller which handles data acquisition and data transmission. This information is received by specially designed application interface running on pc connected through Wi-Fi wireless link .The data generated will be in excel as well as graphically format using LABVIEW software for analysis purpose. The Proposed system is also capable of generating short time alerts based on weather parameters. It gives an on line & real-time effects. The idea behind to this work is to monitor the weather facility & warm AMC from environment effect.

- **Graphical User Interface**

A graphical panel of GUI made in LabVIEW is developed as shown in fig. The data is displayed in both graphical and numeric form. Virtual Instrument Software Architecture (VISA) API is used to interface sink node with LabVIEW. VISA is a standard I/O API for instrumentation programming. It is a standard for configuring, programming & troubleshooting instrumentation systems comprising GPIB, VXI, PXI, Serial, Ethernet, and/or USB interfaces. VISA is adopted as it is interface independent

The monitored data is stored in sheet with current date and time. In the front panel, user can configure the system setup. The programming is developed in such a way that the excel sheet stores the actual time of sensing instead of delayed time, depending on time data entered in front panel by user.

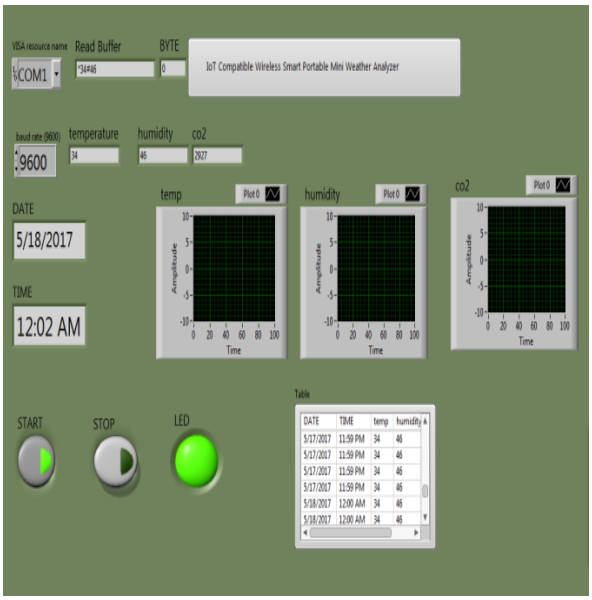

Fig 2.Graphical User Interface

- **PROPOSED IOT-SN DEPLOYMENT**

To test the functionality of the proposed IoT enabled monitoring system, the proposed IoT-SN was deployed under varying conditions. Fig shows the deployment of the proposed system.The transmitter node is placed near an office building (where monitoring was easier) and receiver node was kept at a distance of approx-imately 10 metres from the transmitter node. Temperature, humidity and CO_2 concentration is monitored. Related results are shown in Fig 8. As can be seen, temperature is seen to be varying between 34.5 ˚C to 42.2˚C, humidity variation is between 21.1 % to 30.2 % and CO_2 concentration is varying between 1182 ppm to 1355 ppm.

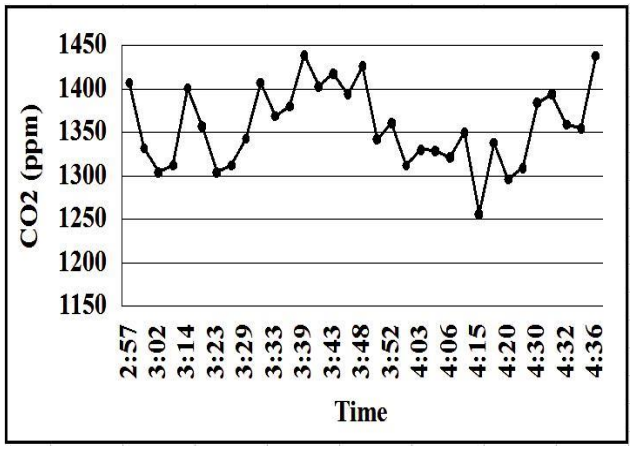

Fig 3.CO_2 Results

Results shown in Fig 3. represents variation of CO_2, in the range of 1256 ppm to 1439 ppm, for different areas of the Gandhinagar.

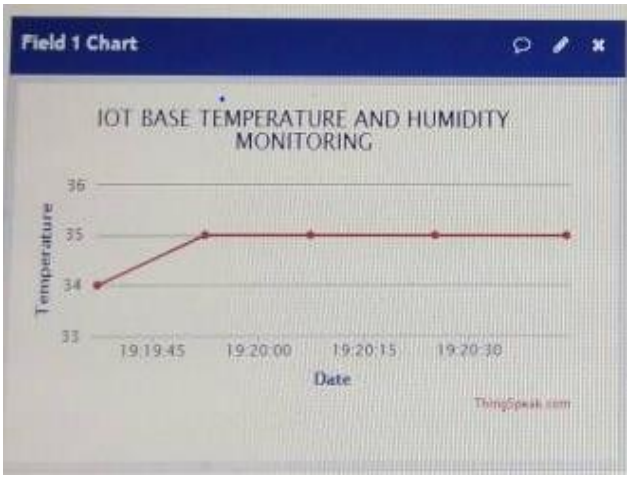

Fig. 4.Temperature result

After a few iterations, the proposed IoT WSN was tested for the environmental conditions in the city of Gandhinagar, Ahmedabad, India during the same month. Data was monitored wirelessly through receiver connected to the PC and was recorded in an excel sheet through GUI made in LabVIEW .

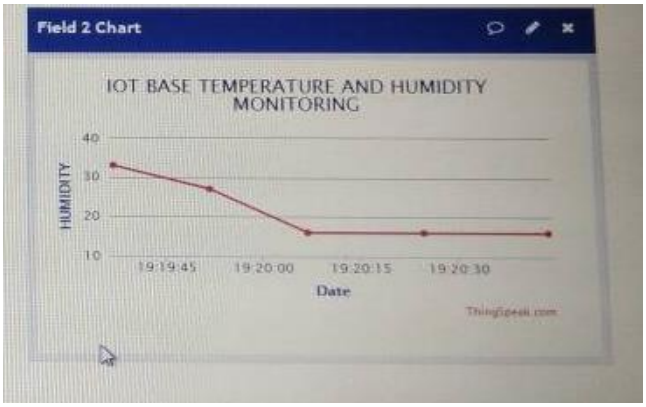

Fig.5 Humidity result

10. CONCLUSION

After studying reserch paper it can be conclude that data received on the Wi-Fi can be displayed on the pc with a GUI using IoT.Data aquisition becomes easy with sensors and wireless moduels using LABVIEW and PC.Interfacing the digital sensors with arduino and testing of it for transmitting and receiving the proper data of the sensor. transmission and reception of all the wireless module will be tested after interfacing .Connection of LABVIEW and arduino using National Instrument.

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