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E-Mail :
editor.ijasem@gmail.com
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IoT Based Environmental Monitoring System using Arduino UNO and Thingspeak

Dr. P.Ramesh, Professor, Department Of ECE, SICET, Hyderabad
M.Sanjana, M.Sreeja, R.Rajesh Nayak, S.Manish Reddy
Department Of ECE, SICET, Hyderabad

Abstract

Due to climate change, taking care of the environment has become important. In order to make good enviro nmental decisions, environmental measures must be followed regularly. Since IoT is the latest technology, i t plays an important role in collecting data from sensors. Generally speaking, the room temperature meter m easures temperature, humidity, humidity, etc. It has different parameters such as. This article uses Arduino UNO and WiFi modules to help detect data and send it to Thingspeak Cloud. So what is received is not stor ed on the cloud platform (Thing). Changes in the environment are updated in the form of data from cloud c omputing. The comments also include details on creating a public pipeline for public review and review. Cr eate an Android app for direct access to metrics.

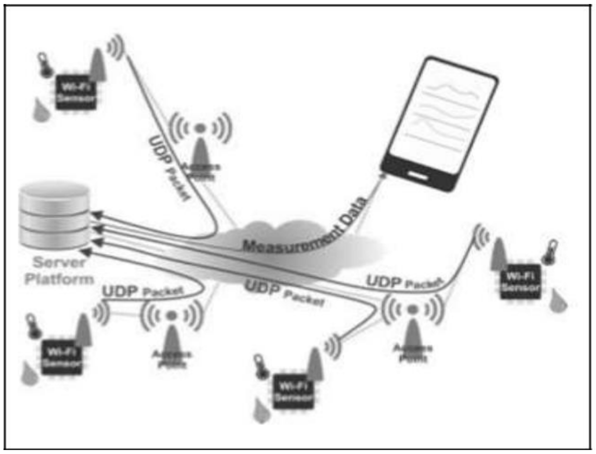
Keywords: Sensor, Thingspeak, Arduino UNO, Wi-Fi, Internet of Things

I . Introduction

Internet services are required to collect and share data efficiently. The Internet of Things refers to the rapidl y growing network of connected devices that collect and share information using sensors. Today, it is widel y used in many areas and plays an important role in the environmental assessment process. The integration of IoT and cloud computing enables new technologies that can better manage data from different sensors co llected and transmitted by the "Arduino UNO", a lopower, lowcost microcontroller. Thingspeak is an open source website used to test updates. Thingspeak is an open source IoT application and API for collecting an d storing data from sensors on the Internet using the HTTP protocol. Thingspeak is an IoT analytics platfor m service that allows you to collect, visualize and analyze data in reatime in the cloud. The cloud uses grap hical visualization work and is presented to users in the form of a virtual server, and the product communic ates with the cloud through a "wireless Internet connection" available to users, and most sensors provide en vironmental simulation data. . IoT helps bring everything together and allows us to communicate with our p roducts. Measurement results can be accessed in formats such as JSON, XML and CSV. In this process, use rs can access the environment directly, thus eliminating the need for a third party.

II. Existinsystem

In recent years, climate change and environmental protection and management have attracted great attentio n. This paper presents three different IoTbased wireless sensors for environmental and environmental monit oring: one uses WiFi communication based on User Datagram Protocol (UDP); one uses WiFi and hypertex t transfer protocol (HTTP) for communication, and the third uses Bluetooth technology. The above method helps collect data from remote sites and view data on any device with a network connection. Here, Zigbee i s used to monitor and control applications that require wireless connectivity. UDPbased cyberphysical syste m monitors temperature and humidity. The loss here is due to the network itself. WiFi sends UDP or HTTP packets to the cloud platform, which is accessible only to administrators who decide whether the informatio n should be public or private. BLE consists of sensors placed in various locations that create a beacon when data is sent.When a beacon is created, the server receives data from the sensor. The current environmental monitoring system (EMS) uses the UDP protocol, which requires connection establishment and IP matchin g every time. There is no direct access to geographic information as the information is sent to headquarters where administrators play an important role.



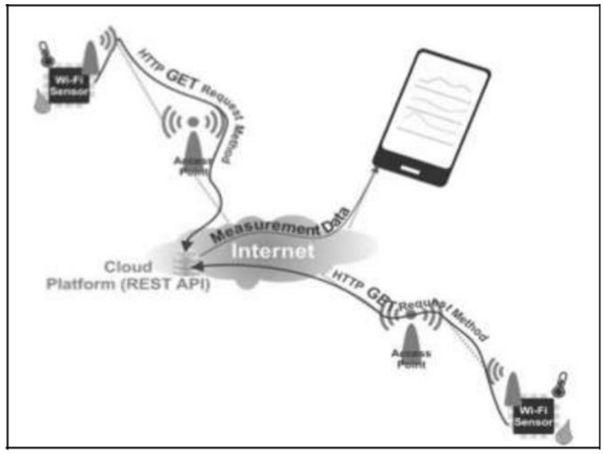


Fig. 1: EMS with communication based on UDP Fig. 2: EMS with communication based on HTTP requests

III. THINGSPEAK

Thingspeak is an open source IoT application and API for collecting and storing data from sensors on the In ternet using the HTTP protocol. It is an IoT analytics platform that allows you to collect, visualize and anal yze data in real time in the cloud.

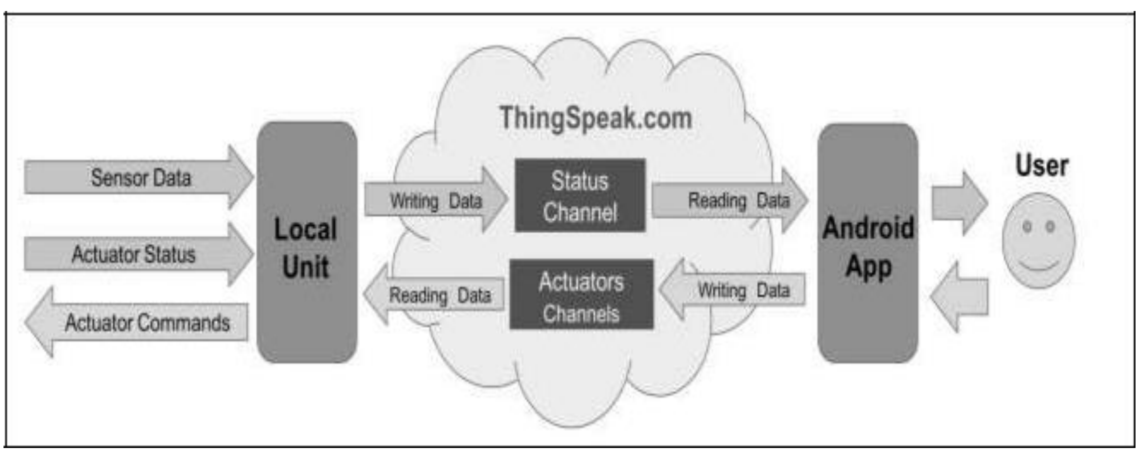


Fig. 3: Working of Thingspeak

The main task of regularly updating data is handled by Thingspeak, which has an API to collect data genera ted by sensors and an API to read this data from applications. This article is divided into two parts. Part of t he trick is programming something to send data. And the second thing is that others have to look at things. Thingspeak sits in the middle, making it easy to do both at the same time. This document contains informati

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on about air temperature, humidity, humidity, etc. Simple tools are being used to create a proof of concept for IoT. It can also be modified using different sensors or actuators to create something for individual purposes. Therefore, after completing the above processes, the user can directly access all environments.

INTERNET OF THINGS

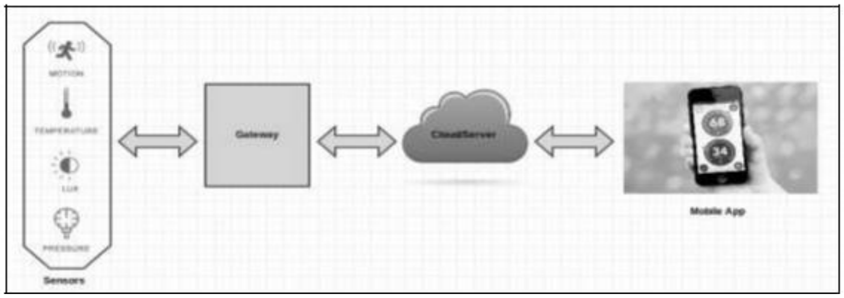

Fig. 4: Working of Internet of Things

V. PROPOSED SYSTEM

The proposed system monitors parameters such as humidity, temperature, humidity, precipitation, oil content and earthquake warning with the help of realtime sensors. These parameters are regularly monitored at 2-minute intervals by the open source called Thingspeak. Data can be available in one of three formats: JSON, XML and CSV. Sensors in this system collect information about temperature, humidity, humidity, pollution levels, rain and movement of the earth's surface. WiFi network helps transfer data stored on the open platform Thingspeak. Additionally, an application has been created for easier viewing of the collected data. Through the application / Thingspeak, users will be able to use the attack after understanding their agricultural land and carefully analyzing the soil parameters.

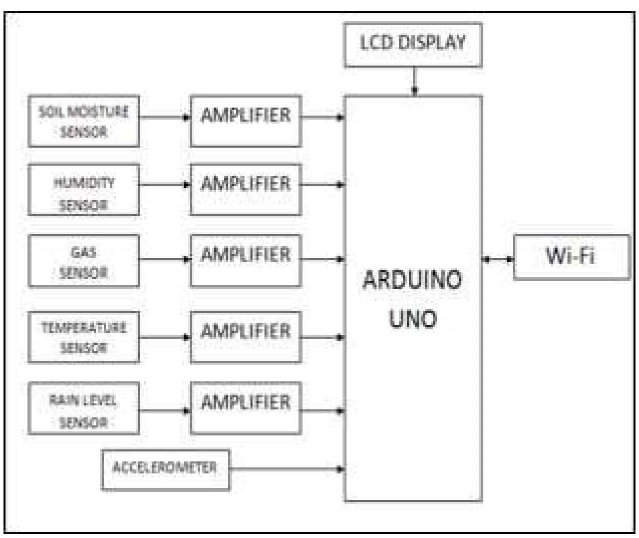

Fig. 5: Block Diagram of the proposed system

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VI. SENSORS USED

A. Soil Moisture Sensor:

Soil moisture sensors measure moisture in the soil. Soil moisture sensors generally refer to sensors that esti mate volumetric moisture content.

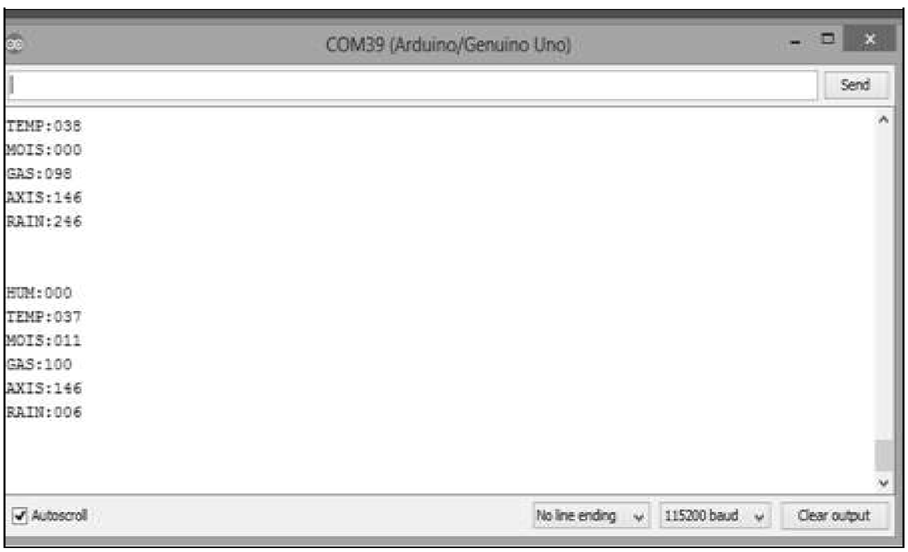
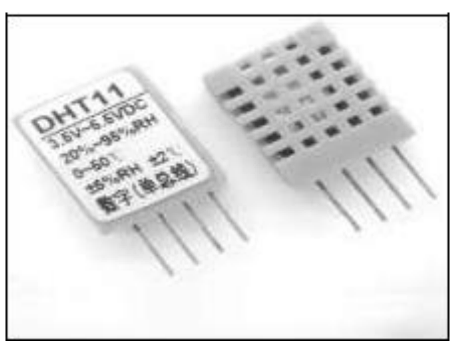


Fig. 6: Result of Soil Moisture Sensor

B. Humidity Sensor:



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The humidity sensor (DHT11) is used to measure water in the air. The signal voltage is given to the inverter input of the comparator. Voltage is fed to the non-inverting input.terminal of the comparator. The reference voltage is given to non-inverting input terminal.

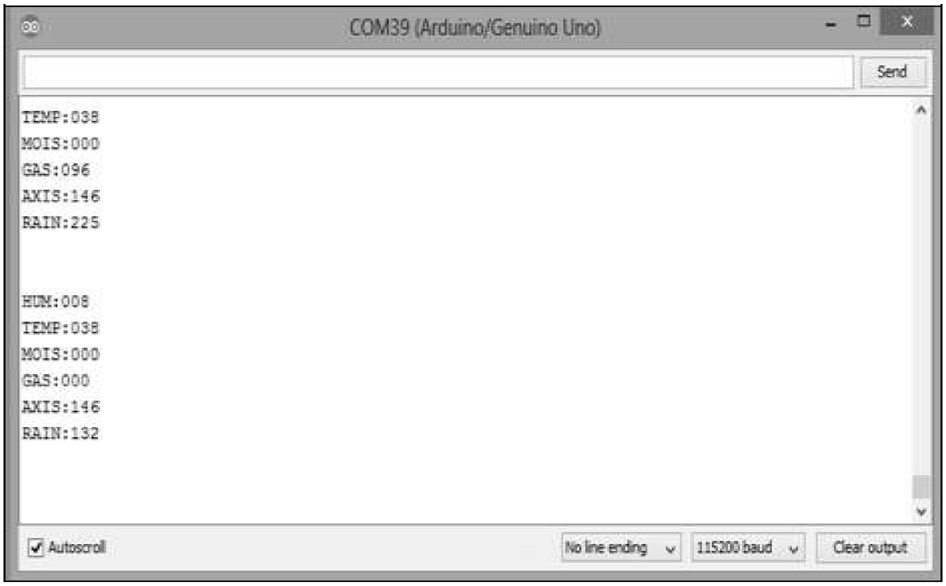
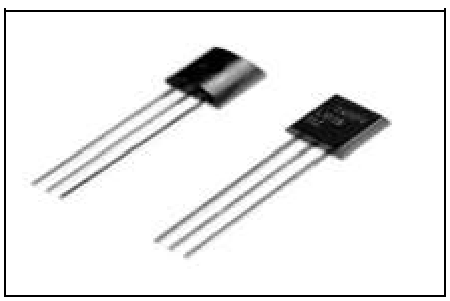


Fig. 7: Result of Humidity Sensor

C. Temperature Sensor:



Temperature sensors are used to measure temperature and their electrical output is proportional to temperat ure. The LM 35 device has a temperature measurement function.

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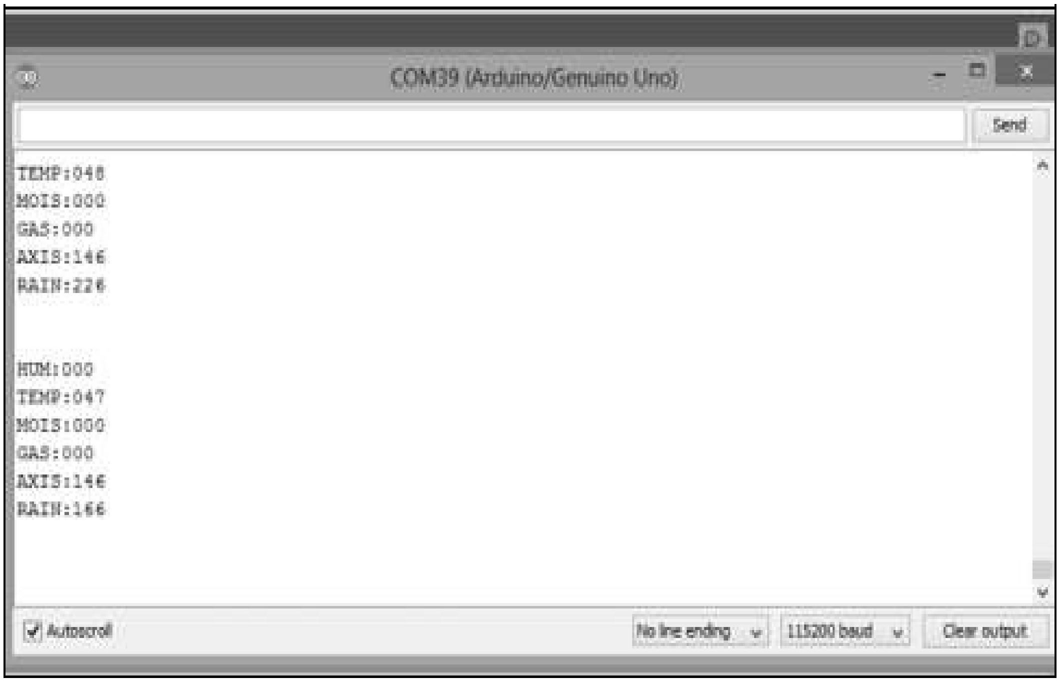
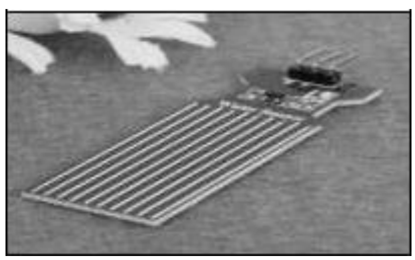


Fig. 8: Result of Temperature Sensor

D. Rain Water Level Detector:



Rain gauges are used to measure the amount of rainfall or water. It completes the cycle of printing to the se nsor card by capturing the water.

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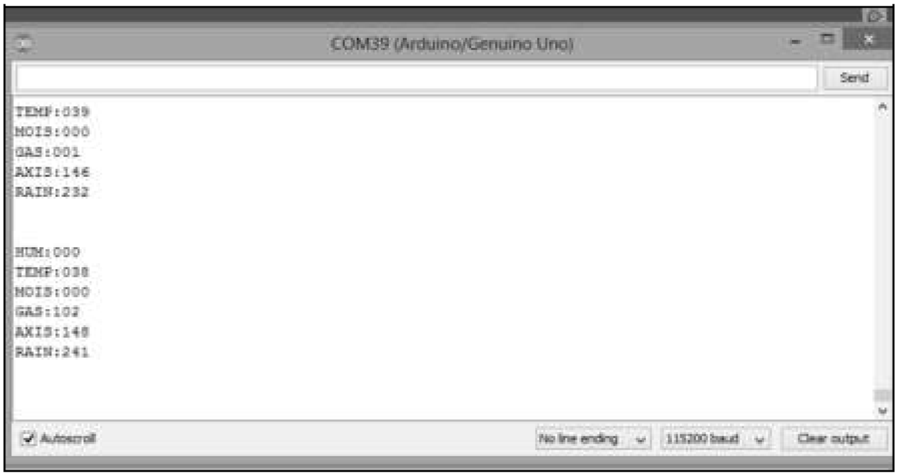
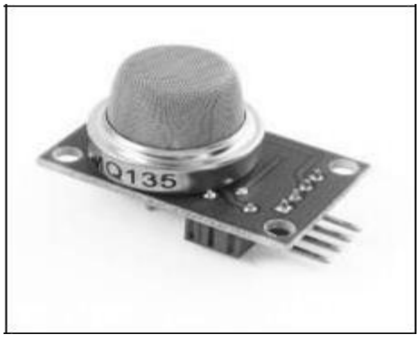


Fig. 9: Result of Water Level Detector

E. Gas Sensor:



A gas meter is a device used to measure the presence of gas in an area, often as part of a security system. M Q 135 sensor is sensitive to ammonia, sulfur and benzene vapors

Fig. 10: Result of Gas Sensor

Accelerometer

Accelerometers measure acceleration in all three axes. The output is in the form of analog values. The interf ace of the microcontroller is therefore very simple.

Fig. 11: Result of Accelerometer

VII. CONCLUSION

Measurements from the sensor are constantly updated for users to view using the EMS (Environmental Mo nitoring System) application. The data is therefore directly accessible and completely independent of third p arties.

fig. 12: Final Result in Android Application

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