IOT BASED WEATHER MONITORING SYSTEM

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Abstract : **The IoT Technology provided in our paper is a very good option for surveillance of the weather parameters in a specified region and make the data visible anywhere in the world. Heavy flood is due to the dynamic alterations in the weather condition. It implements the development of flood monitoring system for storing and retrieving data from the system using NODEMCU ESP8266 where ultrasonic sensor and Led's are used to alert the authorities regarding the heaviness of water. Soil moisture is an vital part of plant life, which will affect the crop growth and yield directly. It implements the development of soil moisture monitoring using microcontroller and sensor. Earthquake warning system detects the first quivering of a major quake using sensor. Nowadays the count of industries and vehicles are increased ,so the quality of air is poor and it affects the human beings. It is important to analyze the quality of air and the amount of harmful molecules in the air using the field of IOT since it has made a drastic evolution. It develops a system which can detect the amount of toxic particles in air like methane, alcohol, benzene and CO_2 using MQ135 sensor. Thing speak stores data in private channel by default. The data can be accessed over internet from anywhere in the world obtained form the embedded system.**

IndexTerms - weather, NODEMCU ESP8266,flood monitoring, soil moisture, earthquake detection, air quality, Thing speak.

I. INTRODUCTION

A weather station is a technology which collects the details using different sensors. This device basically monitors the different weather parameters such as Temperature ,Humidity, Pressure and Rain using Temperature and humidity sensor (DHT11),Barometric pressure sensor (BMP180) and rain sensor (FC37) respectively which is connected to the NODEMCU ESP8266which is the heart of the device. When the code is uploaded on Arduino IDE, the corresponding outputs can be visualized in web browser. Visualize the environmental condition is required to evaluate the live condition of the environment as per the data fetched from the device.[1]

The purpose of flood monitoring system is to detect the water level in river beds and check thier conditions. If water level reaches beyond the limit, it alerts through LED signals withsound of a buzzer. Here, the Ultrasonic HC-SR04 sensor is used to sense the river level . The processed data will be sent to Thingspeak IoT Cloud Platform. To expand an IOT technology flood monitoring system, priorly to monitor the level of water and to alert the people. The collected information is sent to Thinspeak. If the level of water increased, the alert message can be indicated through leds and buzzer.[2]

In soil moisture monitoring, we are making an IOT based soil moisture level indicator using NODEMCU esp8266 and soil moisture sensor by interfacing with thing speak.[3]
In the real-time earthquake detector monitoring system , vibration sensor is used so as to detect the vibrations and the processed data will be sent to thing speak IoT cloud platform.[4]
Air pollution is an complicated thing seen in many areas. Health problems are increasing drastically especially in urban areas of developing countries due to industrialization and increasing in the number of vehicles. Hence leads in the release of lot of gaseous pollutants. So for detecting this MQ135 sensor is used and for detecting gases like methane, benzene, alcohol and CO_2. And the processed data will be uploaded to thing speak platform.[5]

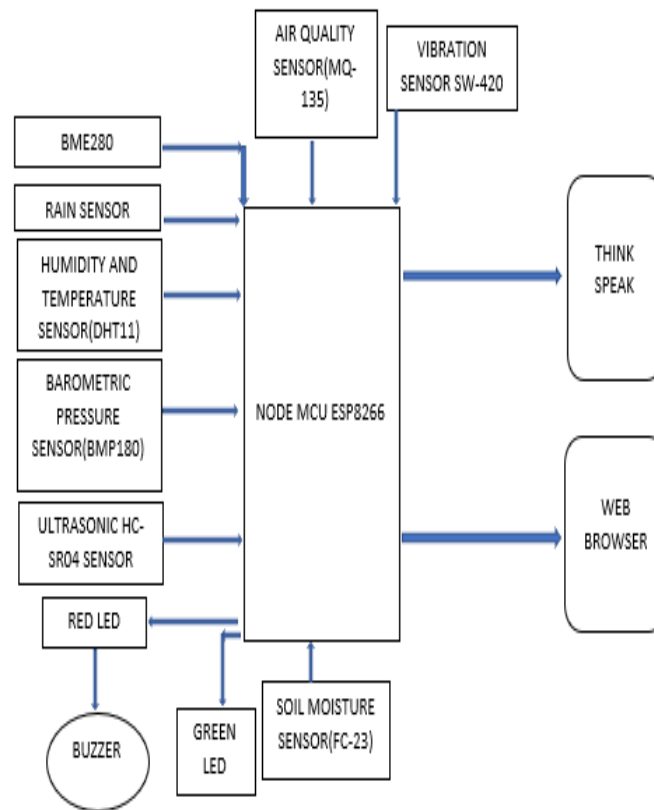The proposed model of IOT based weather monitoring system is shown in the fig 1.

Fig 1:BLOCK DIAGARAM OF IOT BASED WEATHER MONITORING SYSTEM

II. PROPOSED SYSTEM

1.GENERAL WEATHER MONITORING SYSTEM

BMP180, DHT11 and Rain Sensor to Node Assemble all system as per circuit diagram. Program the Node MCU using Arduino IDE. The Node MCU is a programable controller which has inbuilt wi-fi module. Connect these sensors to NODEMCU. This pooled data is stream over the Internet to display it or read it from anywhere. After the successfully programmed hardware, the Node MCU get IP address. We can browse this IP address from WEB browser to display the required live data which fetched by sensors in Graphical User Interface format. The weather parameters that we monitor are Temperature, Pressure, Humidity and Rain .The Proposed model is shown in Fig 2.
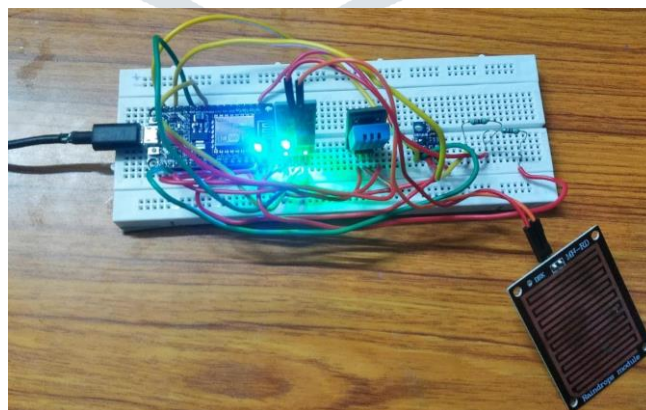

Fig 2: General weather monitoring system set-up

2. FLOOD MONITORING SYSTEM

In fig 3 , flood monitoring system is shown. Here, nodemcu is used as the main component and ultrasonic sonic sensor is kept to measure the distance of water in flooded condition .If red led glows, it implies the flooded condition. It gives the alert message to the buzzer. If green led glows, it implies the normal condition.And the desired graph can be viewed in Thingspeak.
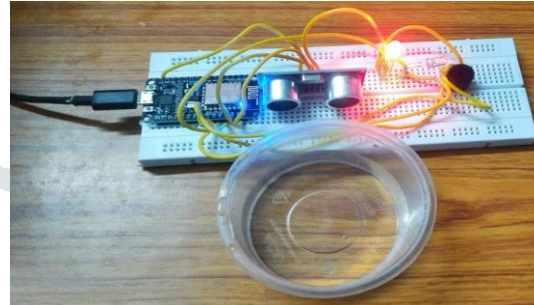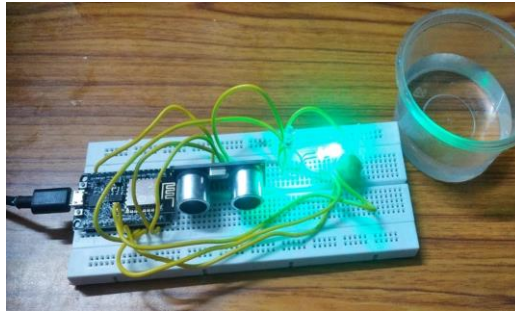
Fig 3: Flood monitoring system set-up

3. SOIL MONITORING SYSTEM

The soil moisture sensor consists two probes to measure the volumetric content of water. The current is passed through the soil by using the probes and it acquires resistance value to measure the moisture content The soil will conduct electricity when more amount of water is available which implies that there will be less resistance. Hence moisture level will be high. And vice versa for dry condition. And the corresponding graph can be viewed in Thingspeak platform. The Proposed model is shown in Fig 4.

Fig 4: Soil moisture monitoring system set-up

4. EARTHQUAKE

Fig 5 shows earthquake monitoring system. Here vibration sensor is used to detect the highness of vibration which indicates the earthquake level. Hereby, we use Thingspeak platform to view the result in the graphical format.
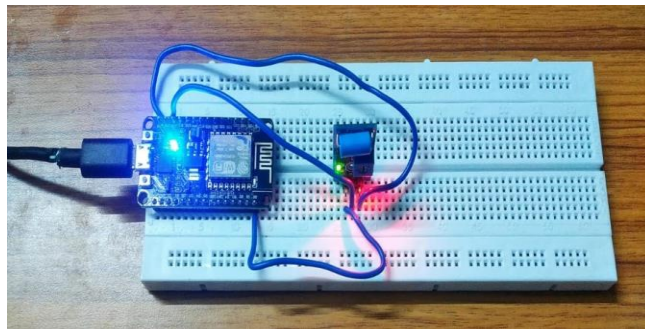

Fig 5: Earthquake monitoring system set-up

5. AIR POLLUTION MONITORING SYSTEM

In this system,we can monitor the pollution level using gas sensor MQ135.It also measures the concentrations of gases like CO, NO2 and CO2 and the result is given in parts per million (PPM).And BMP280is used to measure the pressure. These sensors will gather data of various environmental parameters and send it to the Thingspeak server.The Proposed model is shown in Fig 6.
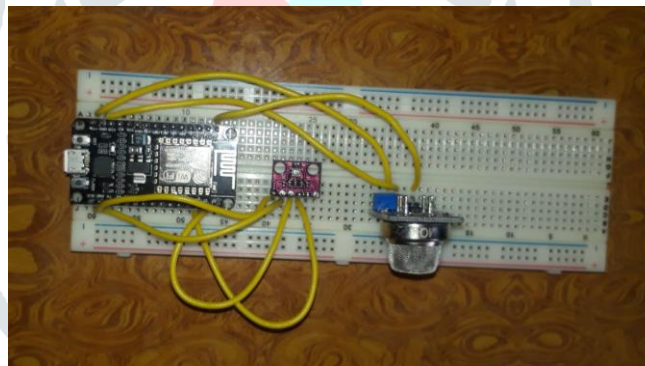

Fig 6: Air pollution monitoring system system

III. SOFTWARE USED

1. ARDUINO IDE SOFTWARE

The Arduino IDE is an integrated development software and it is used to code the microcontrollers. It performs the operation of domains(both local and global) with the help of library functions by interfacing the sensors. It is shown in Fig 7.
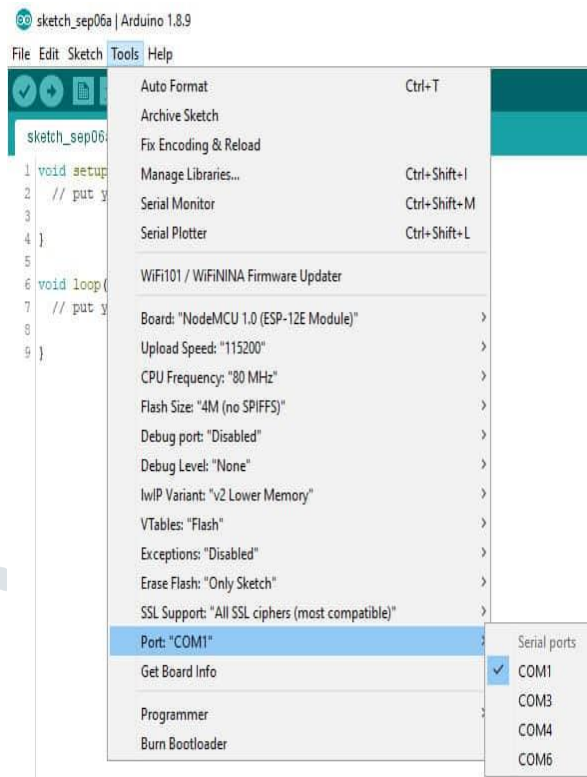
Fig 7: Arduino IDE set-up

2.THINGSPEAK

Thingspeak is an open source IOT cloud based platform which generates API keys to store and collect data from the sensors using internet protocol. In thinkspeak the output can be visualized in the appropriate format. This set-up is shown in Fig 8.
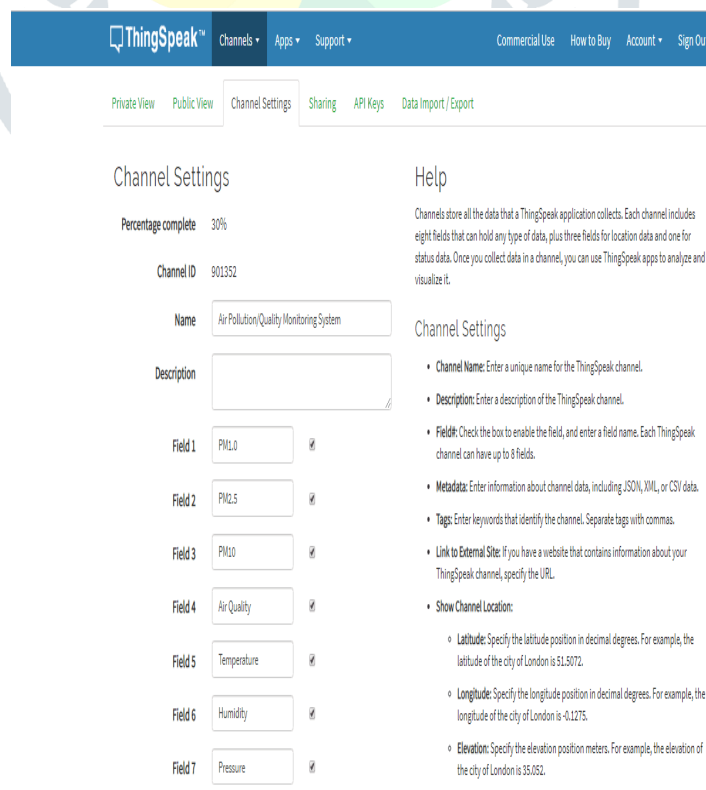

Fig 8:Thingspeak set-up

IV. RESULT AND OUTCOMES

1.GENERAL WEATHER MONITORING SYSTEM

The weather parameters like pressure, temperature, humidity and rainfall has been monitored through web browser in the graphical format. The output is shown in fig
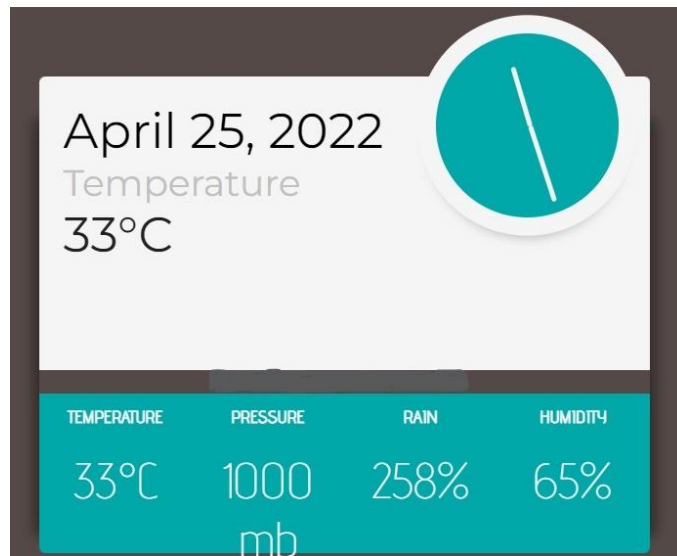
Fig 9:WEBPAGE interface of weather monitoring

2. FLOOD MONITORING SYSTEM

The main purpose of this system is to detect the water level using HC-SR04. If water level is increased, red led will be blinked which indicates the alert. If water level is normal, green led will be blinked which indicates the normal condition. The output data will be displayed in the thingspeak as per Fig 10.
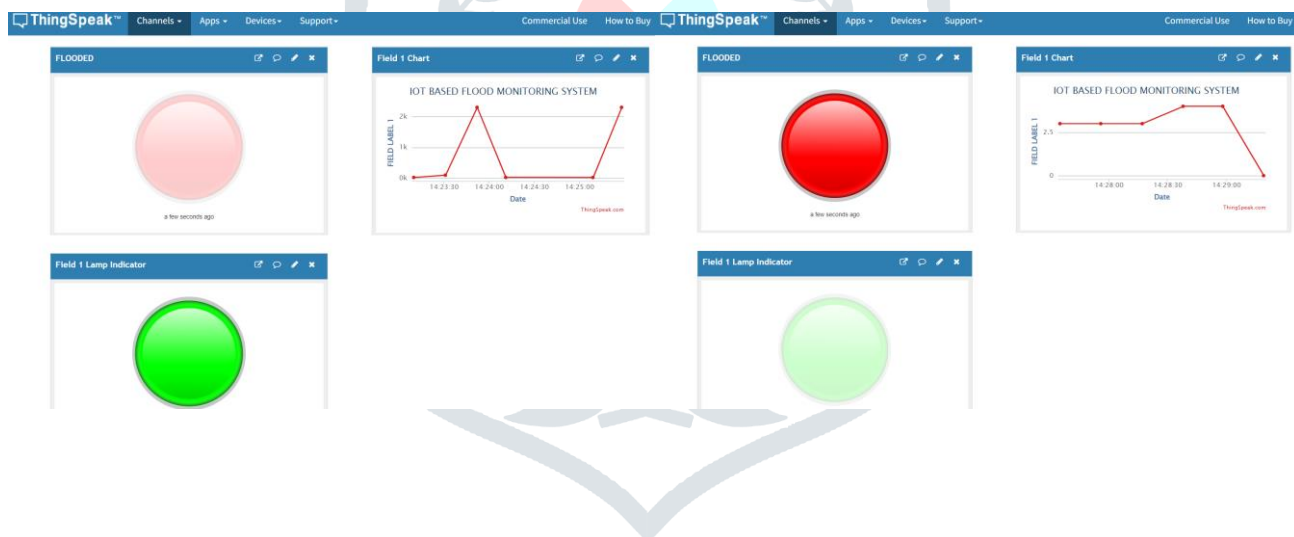

Fig 10: Result from the Thing speak

3 .SOIL MOISTURE MONITORING SYSTEM

The collected information of soil moisture content using soil moisture sensor is sent to the thingspeak IoT cloud platform in graphical format. The result can be viewed as per Fig 11.
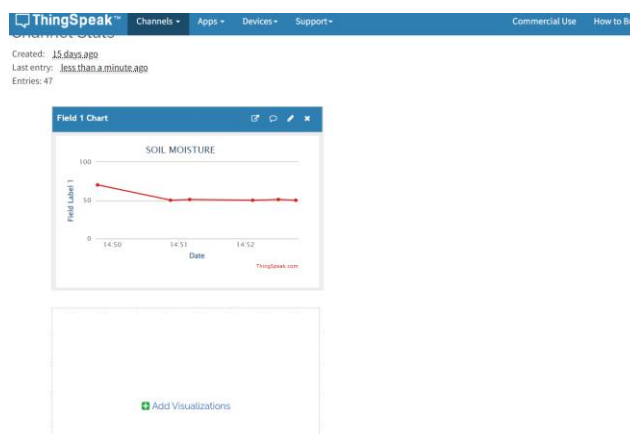

Fig 11: Result from the Thing speak

4. EARTHQUAKE MONITORING SYSTEM

In the below Fig 12 , the graphical format is viewed in thingspeak by the data collected from the vibration during the earthquake.
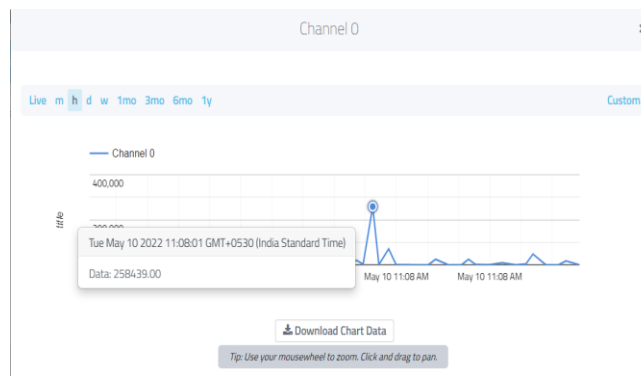

Fig 12: Result from the Thing speak

5.AIR POLLUTION MONITORING SYSTEM

In the below Fig 13 , graphical format is viewed in thingspeak by the data collected from the gas sensor by detecting the dust particles in the air.
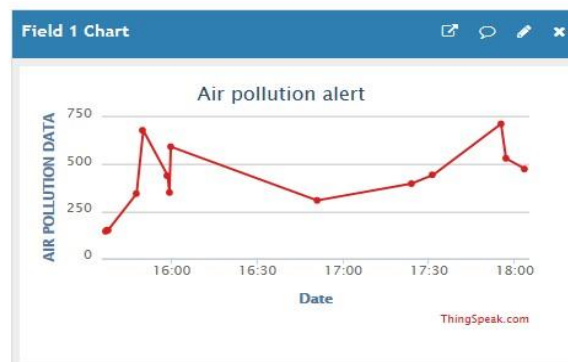

Fig 13: Result from the Thing speak

V. CONCLUSION

Nowadays IOT plays a vital role. As the project is enabled with IOT technology and hence the sensor data can be monitored from anywhere in the world. Thingspeak is one such application platform of IOT service which offers wide variety of features. It is used for storing and processing of data collected .We need to deploy the sensors in the environment , to bring the environment into real life which implies that we can make it to interact with the objects through the network. The smart and easy way to monitor the environment and an low cost efficient embedded system is presented with wide variety of models in our paper. Hence we conclude that the IOT based weather monitoring system is used in our real time applications.
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VII. REFERENCES

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