Environment monitoring system based on internet of things

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***Abstract*—One of the best issues that the world is confronting today is that Environmental contamination.. Monitoring the pollution is crucial in environments and can be accomplished using a small number of inexpensive sensing unities, distributed over an area of interest to measure the level of variousparameters.Environment monitoring is one of the major application of wireless sensor network...The organization of Wireless Sensor Network offers an arrangement through dissipating sensor hubs over a territory. Researchers may straightforwardly recover the detected information from sensor field through a web.**

***Keywords*— WSN, Environment, Sensors**

I.INTRODUCTION

The environmental parameters' variation is essential in order to determine the quality of our environment. The collected data encompass important details for a variety of organizations and agencies..With the results of monitoring, governments can make informed decisions about how the environment will affect the society and how the society is affecting the environment.The data is utilized by many individuals, in view of the climate's impact on an extensive variety of human's activities, for example, agriculture, transportation etc..Certain pollution can't be recognized by human detectswhich means that the population in the vicinity of industrial pollutants are often exposed to long-term harmful effects..At the point when the wellspring of pollution is distinguished, the harm is done and hopeless.The main intention of environmental monitoring is not only to gather data from a number of locations, but also to provide the information required by scientists, planners, and policy-makers, to enable them making decisions on managing and improving the environment, in addition to presenting helpful information to end-users.The Internet of Things (IoT) is a recent communication paradigm that envisions a near future, in which the objects of everyday life will be equipped with microcontrollers, transceivers for digital communication, and suitable protocol..A WSN is a collection of sensor nodes organized into a cooperative network. Sensor nodes are small in size, low in cost, and have short communication range.This paper focuses on .design of wireless sensor network is developed using node MCU.This system is low cost and scalable in terms of sensor types and the number of sensor nodes..ESP8266 modules are used for wireless sensing, actuation system and capable of forming a complex mesh network structure on its own without intervention from user applications program running on the microcontroller.

II.LITERATURE SURVEY

Octavian A.Postolache, J.M.Dias and P.M.B Silva Giraoin[1] 2009 implemented Smart sensor network for indoor and outdoor air quality monitoring. In this system sensor nodes are installed in different rooms and it consist of tin dioxide sensors which was hardwired or wirelessly connected to the central unit. It also measured the concentration of temperature and humidity for accuracy. In this the concept of multiple input single output neural networks was implemented to compensate temperature and humidity influence on gas concentration. Wi-Fi technology was used for communication.

Jen-Hao Liu et al.[2] Introduced micro-scale air quality monitoring system for urban areas in 2012.This System monitors the concentration of carbon monoxide co caused by heavy vehicles emission. Sensor nodes were deployed in highly populated areas. System was integrated with the GSM for data transmission.Gateway collected the data from all sensor nodes and sends to control centre by GSM network

Most of the existing systems use some microcontroller based processing of data and uses a sensor network to collect physical parameters. To store the collected data, we need to maintain a database. Normal data bases cannot handle such huge data.

In the year of 2010 A.R.Al-Ali, Imran Zualkernan and Fadi Aloul[3] introduced Mobile GPRS sensors for pollution monitoring. This included Data acquisition unit, GPRS modem, and GPS module and pollution server. In this DAQ unit, GPRS and GPS were connected to the microcontroller via RS-232 Interface and finally gathered data were sending to the pollution server.

III.PROPOSED SYSTEM

In this project we are using gas sensors, temperature, humidity and pressure sensors to monitor industries areas. Signals from the set of sensors are processed using Node MCU which is a single board computer and collected data is uploaded to the internet where it will be browse anytime anyplace. This system will send alert message to the registered numbers when the harmful gas concentration levels exceeds the permissible limits and conjointly sensors output data is uploaded to the internet using ESP8266. This data will convert in to graphs that visualizing the info on webpage. The public will access the system to know the concentration levels at any time by sending a request SMS to the system.

IV.BLOCK DIAGRAM

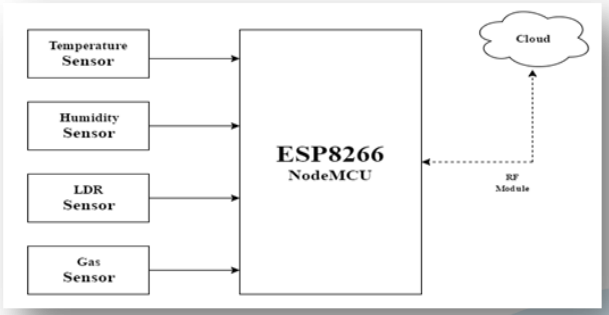

Fig1:Block diagram

. A. NodeMCU

NodeMCU is Open-source Iot platform, it's interactive, programmable and have very low-cost compared with other MCU. It is simple, smart, wi-fi enabled which includes firmware which runs on the ESP8266 Wi-Fi Socket. The firmware uses the Lua scripting language. The Wi-Fi present in MCU of ESP8266 is integrated and easy for prototyping development kit.

ESP8266 Features:

•802.11 b/g/n • Wi-Fi Direct (P2P), soft-AP

•Integrated TCP/IP protocol stack

•Integrated TR switch, balun, LNA, power amplifier and matching network

•Integrated PLLs, regulators, DCXO and power management units

•+19.5dBm output power in 802.11b mode • Power down leakage current of <10uA

•1MB Flash Memory

•Integrated low power 32-bit CPU could be used as application processor

•SDIO 1.1 / 2.0, SPI, UART • STBC, 1×1 MIMO, 2×1 MIMO • A-MPDU & A-MSDU aggregation & 0.4ms guard interval

•Wake up and transmit packets in < 2ms

•Standby power consumption of < 1.0mW (DTIM3).

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B.LDR

An LDR or Light Dependent Resistor is also known as photo resistor, photocell, photo conductor. It is a one type of resistor whose resistance varies depending on the amount of light falling on its surface. When the light falls on the resistor, then the resistance changes. When the LDR is in darkness, then it can be used to turn ON a light or to turn OFF a light when it is in the light. A typical light dependent resistor has a resistance in the darkness of 1MOhm, and in the brightness a resistance of a couple of KOhm. The equation to show the relation between resistance and illumination is as follows: R = A.E^a where E – Illumination (lux) R – Resistance (Ohms) A,a – constants The value of 'a' depends on the CdS used and on the manufacturing process. Values usually range betwee 0.7 and 0.9.

Advantages:

•LDR's are cheap and are readily available in many sizes and shapes. Practical LDRs are available in a variety of sizes and package styles, the most popular size having a face diameter of roughly 10 mm. They need very small power and voltage for its operation. Disadvantages:

•Highly inaccurate with a response time of about tens or hundreds of millisecond.

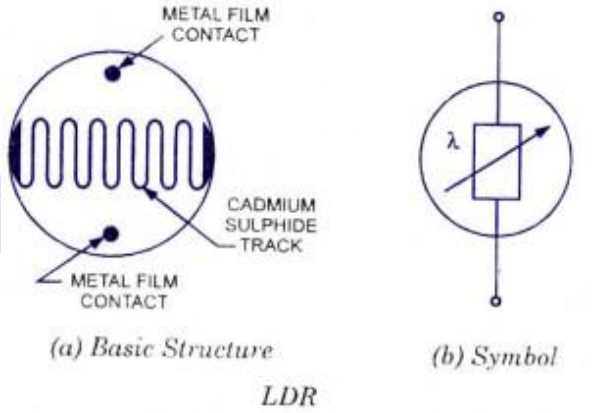

Fig2:LDR

C.DHT-11

The dht11 is a basic, ultralow-cost digital temperature and humidity sensor with a calibrated digital signal output. it uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). the dht11 sensor has four pins. connect the first pin on left of sensor (vcc) to 5v of your board, the second pin (data pins) to digital pin 3 and the fourth pin (gnd) to ground. when the connecting cable is shorter than 20 meters, a 5k pull-up resistor between the second pin of sensor and 5v is recommended.

Fig1 shows the parts-of-speech tagging of a sentence,"The teacher praised the student".

Features:

•Low cost

•3 to 5V power and I/O

•2.5mA max current use during conversion (while requesting data)

•Good for 20-80% humidity readings with 5% accuracy

•Good for 0-50°C temperature readings ±2°C accuracy

•No more than 1 Hz sampling rate (once every second)

•Body size 15.5mm x 12mm x 5.5mm4 pins with 0.1" spacing

D.MQ-6

This is a liquefied petroleum gas (LPG) sensor, suitable for sensing LPG (composed of mostly propane and butane) concentrations in the air. The mq-6 can detect gas concentrations anywhere from 200 to 10000ppm. The output of this sensor is an analog resistance.

Features :

•High sensitivity to LPG, iso-butane, propane •Small sensitivity to alcohol, smoke.

•Fast response

•Stable and long life Simple drive circuit

E.BUZZER

This is the Arduino Buzzer Module. Through the Arduino or other controllers, this module will be able to control the buzzer sounds or MID music easily. It is extended with the Arduino

board sensors used in combination, to achieve the control of an interactive sound and light works.

V.CIRCUIT DIAGRAM

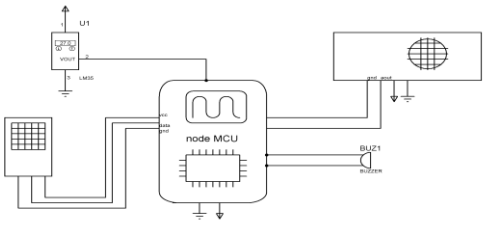

Fig3:Circuit diagram

VI.DIAGRAMS

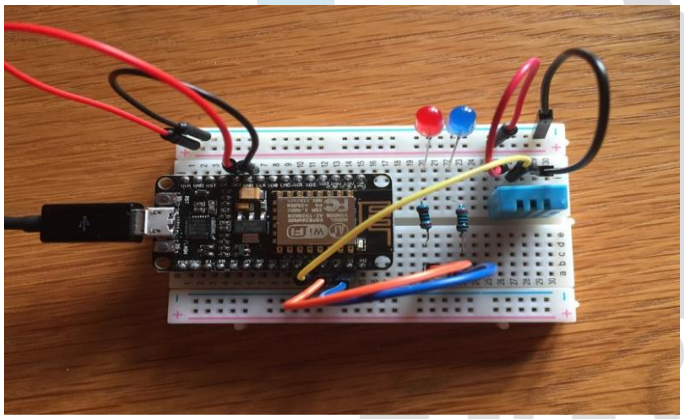

Fig4:NodeMCU with DHT sensor

VII.DESIGN

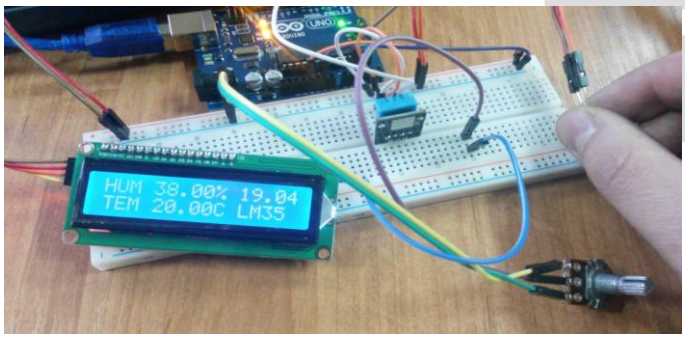

Fig5:Transmit Section

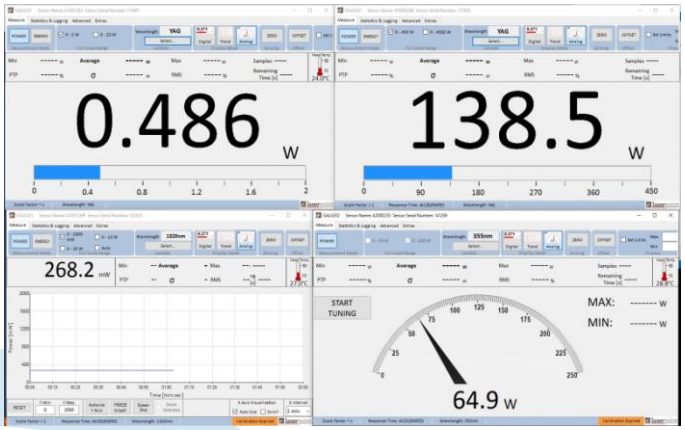

Fig6:Reciever Section

VIII.CONCLUSION

In present days especially peoples are facing major health problems due to environment pollution. This project describes about the design and implementation of a remote monitoring system to measure the gas concentration levels, humidity, temperature and light dependency at landfill sites and industries. Wireless monitoring of field not only allows user to reduce the human power, but it also allows user to see accurate changes in it. WSNs are traditionally considered key enablers for the IoT paradigm. It has been observed that wireless sensor network based environment monitoring systems are low cost, small size and easily reliable. Wireless sensor networks can help bring about a revolution in automating agriculture. This project would simplify plant monitoring process and reduced human effort drastically. User can create pollution free environment for future.The flow presented in this paper can be used to guide the specification, optimization and development of WSN platforms for other IoT application domains.

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