

Air Quality Detection System using Think speak

¹Ms. B. Nivetha, Assistant Professor, Dept. of Biomedical Engineering,
Jerusalem College of Engineering, Chennai, India

Abstract:

Air pollution may be a growing issue nowadays. It is necessary to look at air quality and keep it in restraint for a much better future and healthy living for all. Here we are proposing an air based quality monitoring method which allows us to monitor and crosscheck live air quality during a selected area through IOT. System uses air sensors to sense presence of harmful gases/compounds within the air and constantly transmit this data to microcontroller. Our system keeps on measuring sound level and send reports it to the web server over IOT. The sensors interact with microcontroller which processes this data and transmits it over internet. This allows authorities to observe pollution in several areas and take action against it.

1.Introduction

1.1.Overview:

The main objective of IOT Air & Sound Monitoring System is that the Air and noise pollution may be a growing issue these days. It's necessary to watch air quality and keep it under control for a far better future and healthy living for all. because of flexibility and low cost Internet of things (IoT) is getting popular day by day. With the urbanization and with the increase within the vehicles on road the atmospheric conditions have considerably affected. Harmful effects of pollution include mild allergies like irritation of the throat, eyes and nose also as some serious problems like bronchitis, heart diseases, pneumonia, lung and aggravated asthma. Monitoring gives measurements of air pollutant and noise pollution concentrations, which may then be analyzed interpreted and presented. This information can then be applicable in some ways . Analysis of monitoring data allows us to assess how bad pollution and noise pollution is from day to day.

The commercial meters available within the market are Fluke CO 220 carbon monoxide gas meter for CO, Amprobe CO2 meter for CO2, ForbixSemicon LPG gas leakage sensor alarm for LPG leakage detection. The researchers during this field have proposed various air quality monitoring systems supported WSN, GSM and GIS. Now each technology has limited uses consistent with the intended function, as Zigbee is supposed for users with Zigbee trans-receiver, Bluetooth. GIS based system is meant , implemented and tested to watch the pinpoints of pollution of any area. It consists of a microcontroller, gas sensors, mobile unit, a short lived memory buffer and an internet server with internet connectivity which collects data from different locations together with coordinate's information at certain time of each day . The readings for particular location are averaged during a closed time and space. the world-wide Positioning System (GPS) module is attached to a system to supply accurate representation of pollution sources in a neighborhood . The recorded data is periodically transferred to a computer through a General Packet Radio Service (GPRS) connection then the info will be displayed on the dedicated website with user acceptance. As a result sizable amount of individuals are often benefited with the massive change.

2.2.Objective:

- A) To compute and display the temperature and humidity levels of the present environment.
- B) To combine advanced detection technologies to produce an air quality monitoring system to be in low cost
- C) To detect which we sensed and the data in user friendly format in LCD display panel.

2. Proposed System:

We propose an air quality also as noise pollution monitoring system that permits us to watch and check live air quality also as noise pollution in a neighborhood through IOT. System uses air sensors to sense presence of harmful gases/compounds within the air and constantly transmit this data. Also, system keeps measuring sound level and reports it. The sensors interact with arduino uno which processes this data and transmits it over the appliance. this enables authorities to watch pollution in several areas and act against it. Also, authorities can keep a watch on the noise pollution near schools, hospitals and no honking areas.

3. METHODOLOGY

3.3 Circuit components involved:

- MQ135 Gas sensor
- Arduino Uno
- Wi-Fi module ESP8266
- 16X2 LCD
- Breadboard
- 1K ohm resistors
- 220 ohm resistor
- Buzzer



Figure:Block Diagram

3.4 IOT

Basically, IoT maybe a network during which all physical objects are connected to the web through network devices or routers and exchange data. IoT allows objects to be controlled remotely across existing network infrastructure. IoT may be a good and intelligent technique which reduces human effort also as quick access to physical devices. this system also has autonomous control feature by which any device can control with none human interaction.

3.5.Arduino

Arduino is an open-source electronics platform supported easy-to-use hardware and software. Arduino boards are ready to read inputs - light on a sensor, a finger on a button, or a Twitter message - and switch it into an output - activating a motor, turning on an LED, publishing something online. All Arduino boards are completely open-source, empowering users to create them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it's growing through the contributions of users worldwide.



Figure:Arduino Uno

3.6 Gas Sensor MQ135:

The Sensitive fabricutilized in MQ135 sensor is SnO₂. The conductivity of this fabric is decrease in easy air. The sensor conductivity will increase with the increasing attention of goalpollutantsfueloline.



Figure:Gas Sensor

MQ135 can monitor one of a kindforms ofpoisonous gases includingsulphide, ammonia fueloline, benzene collection steam and CO₂. The detection variety is 10-10,000 ppm with the voltage fee of approximately 5.0V±0.1V AC or DC. The vitalcapabilities are lengthyexis-tence span, low cost, easymotive force circuit and correct sensitivity to poisonous gases. MQ one hundred thirty fivefuelolinesensor is broadlyutilized incommercialfueloline alarm, trans-portablefueloline detector and homefueloline alarm as proven in Fig.1. MQ-one hundred thirty five is used for tracking CO₂ in air.

The gadget of ceaseless net checking makes use of sensors to display screen the numerical value, and in a whileswitch to manageawarenessvia way of means ofgadget. The technique for facts move consists ofstressed out and wi-fi frameworks. Despite the truth that framework is stableit's far having weaknesses anywhere and dynamic range, for example, complex gadget cabling, expensive and so forth. With broadly creating correspondence advances, currently multi day's air Pollution checking framework is often in wi-fi mode.

3.7.ESP8266 Wi-Fi Module:

The ESP8266 Wi-Fi Module is a self contained SOC with included IP protocol stack that could deliver any microcontroller get entry to your Wi-Fi network. Wi-Fi module is able to both web website hosting an software or offloading all Wi-Fi networking features from every other software processor. Every ESP8266 module comes pre-programmed with an AT command set firmware, meaning, we will simply hook up with the Arduino device. The ESP8266 module is an extraordinarily value powerful board.



Figure: ESP module

3.8.Working:

We begin with connecting the ESP8266 with the Arduino. ESP8266 runs on three.3V and if you may offer it 5V from the Arduino then it won't work nicely and it can get damaged. join the VCC and the CH_PD to the three.3V pin of Arduino. The RX pin of ESP8266 works on 3.3V and it'll now no longer communicate with the Arduino while we're capable of join it straight away to the Arduino.

This device and makes your projects very powerful, it may communicate with any microcontroller and it is the maximum principal gadgets within the IOT platform. research greater approximately proper here. Then we are able to be a part of the MQ135 sensor with the Arduino. connect the Vcc and the floor pin of the sensor to the 5V and floor of the Arduino and the Analog pin of sensor to the A0 of the Arduino. connect a buzzer to the pin eight of the Arduino at the manner to begin to beep at the same time as the scenario will become true. The MQ135 sensor can experience NH₃, NO_x, alcohol, Benzene, smoke, CO₂ and a few exclusive gases, so it's far perfect fueloline sensor for our Air quality monitoring venture. while we are capable of join it to Arduino then it's going to sense the gases, and we are able to get the pollutants level in PPM (components in keeping with million). MQ135 fueloline sensor gives the output in shape of voltage tiers and we want to transform it into PPM. So for changing the output in PPM, right right here we've were given used a library for MQ135 sensor, it's having in element in "Code clarification" phase underneath.



Figure:LCD display

RESULT:

Sensor became giving us charge of 90 at the same time as there was no fueloline near it and the secure stage of air is 350 PPM and it have to now not exceed 1000 PPM. whilst it exceeds the limit of 1000 PPM, then it starts off evolved cause headaches, sleepiness and

stagnant, stale, stuffy air and if exceeds beyond 2000 PPM then it can cause advanced heart charge and different diseases. while the price might be less than 1000 PPM, then the liquid crystal display and website will display “fresh Air”. each time the charge will increase 1000 PPM, then the buzzer will begin beeping and the liquid crystal display and website will show “bad Air, Open home windows”. If it'll growth 2000 then the buzzer will keep beeping and the lcd and internet site will display “hazard! pass to easy Air”.

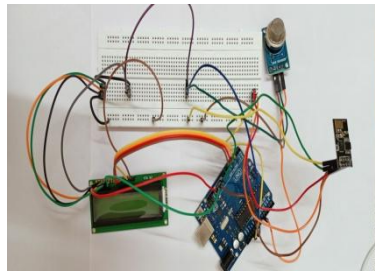


Figure : Overall Project

CONCLUSION:

This technique which we proposed to reveal the air of surrounding the usage of Arduino microcontroller, IOT Technology is proposed to improve great of air. With the usage of IOT generation complements the procedure of tracking numerous factors of surroundings such as air great tracking difficulty proposed on this paper. Here the the usage of of MQ135 fuel-line sensor offers the feel of different sort of frisky fueloline and arduino is the coronary heart of this project which controls the whole procedure. Wi-Fi module connects the entire procedure to net and LCD is used for the visual Output. The Automatic Air & Sound control gadget is a leap forward to make a contribution a technique to the most important threat. The highly-polluted region that is complete method to net and LCD is used for the visual Output. The Automatic Air & Sound control machine is a leap forward to make contributions a option to the largest threat. It helps the brand new era and correctly helps the wholesome existence concept.

REFERENCES:

1. <http://www.circuitbasics.com/how-to-set-up-the-dht11-humidity-sensor-on-an-arduino/>
2. <https://playground.arduino.cc/Main/DHT11Lib>
3. <https://www.robot-r-us.com/vmchk/sensor-temp/humid/dht11-temperature-and-humidity-sensor.html>
4. <https://electrosome.com/power-supply-design-5v-7805-voltage-regulator/>
5. <https://www.epa.gov/air-research/air-monitoring-measuring-and-emissions-research>
6. <http://howtomechatronics.com/tutorials/arduino/dht11-dht22-sensors-temperature-and-humidity-tutorial-using-arduino/>
7. [tutorial-using-arduino/](http://howtomechatronics.com/tutorials/arduino/dht11-dht22-sensors-temperature-and-humidity-tutorial-using-arduino/)