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SOAK PIT MONITORING SYSTEM USING IOT

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ABSTRACT :

Nowadays, people are pretentious by hazardous environment . The professional and service sector is keep on increasing day by day. But, the safety measures become harder with respect to the employee , the rapid growth in industries and urbanisation has made harsh impact on the ecosystem. Our intention of this project is to detect the toxic gases and water level in household areas using automatic detection. There have been many efforts made to address this issue by using a large number of special monitoring devices. MQ7 Gas sensor can detect and provide the gas concentration reports within their individual ranges through LCD display. Our project is to monitor the soak pit which is commonly used in many domestic areas, it is an underground structure that disposes of unwanted water, most commonly storm water runoff, by disposing it into the ground. The water from the soak pit drips and contaminates the local ground water. If the size of the soak pit constructed in individual home or colony is is not proper, the pit fills faster and leads to overflow of water from the soak pit. It may cause bad odour because of the poor maintenance of unwanted water and also leads to spread of many disease, so it is vital to monitor the filling of soak pit in densely populated areas. we monitor this by use of toxic sensors to avoid such circumstances . This project intended monitor water level and harmful gases like methane, carbon dioxide, sulfur dioxide, and nitrous oxides. In addition, chlorine bleaches , and to intimate alert message which display the gas concentration , level puts a alert message through the human-computer interface using internet of things . This model can be future extended for providing better living environment for people in and around industries with a pollution controlled environment.

Keywords : Toxic gases , Wifi Module , Water level , Detection System

INTRODUCTION:

This framework is utilizing restricted radiation sensor and gases sensor, these sensors are gathering information conveying to IoT component. The primary goal of the complete context is recognize the radiation leakage and venomous gas. In case any radiation or poison gases are present in industry regions, the industries are influence the gases or radiation mostly in nearby living people. Specific harmful gases are continuous breathing intake the human body continues causes might be going to die. If the few gases are scentless, they will be unprotected for a long time that means cause significant health problems. Relies upon based unreliable gasses and radiation detection [1-2]. This gadget decides of gases and radiation in devices such as CO, ammonia, methane & infrared radiation. Co (carbon monoxide) is scentless which with concentration over 150ppm cause confusion, nervous damage, unconsciousness, and fainting, above it will kill the human being. Every gas has its own physical and chemical properties that make them difficult to investigate without any instrument. Dangerous gases exhibit at different levels depending upon the density and concentration of it. The gas sensor is performing like gas molecule to absorb the gas sensor created high temperature, that temperature change over into electrical signal. Initially, the sensor identifies the small amount of gas leakage after leakage amount is enormous go the adverse condition is high means produced an electrical signal to the device. Radiation sensor working similar to it measured the number for counts striking per every minute distinguished by radiation sensor. Temperature sensor sensing room temperature state. This sensor gathering information sends on ARDUINO UNO board. Arm microcontroller officially programmed that program operation dependent upon gases and radiation observing level identification. Assume getting sensor value level is a high mean in board one pin associated to alarm it generates sound alert toward industries people, the surrounding fire station, and police station. This indication based on saved industries nearby human life move to a protected place. The device has an LCD display it shows any leakage happening time signal presentation in LCD. Arduino uno board is receiving information transferred to Ethernet module or Wi-Fi module by connected to the internet. Module IP-address knows mean anyone can see the information data. Generate a website notice the data any hazard information means highlighting. Abnormal information indication alert by the client. Web page information gets to see many people means set multi-client it prevents human begin life.

LITERATURE SURVEY

Title: Toxic gas detection and monitoring utilizing internet of things
Author: Mohan Kumar Chandol Chalasani Srinivas
Abstract:

Harmful gas leakage accidents are the main reason for workers death in industries which work mainly using chemicals. Gas leakage can be easily detected and controlled by using latest trends in information technology by applying internet of things. This project intended to avoid industrial accidents and to monitor harmful gases and to intimate alert message to safety control board of industry using Arduino Uno R3 and internet of things. Ardunio Uno R3 board is used as central microcontroller which is connected with sensor. Such as temperature, gas sensor, alcohol sensor which can continuously monitor respective environmental parameters. Hence this device may be used as multi gases detection apparatus more over the rate of response is high. An alarm is produced instantly if the level of the gases goes above the normal level means indication through the internet specific receiver section. Data received by sensor is stored in internet which can be used for further processing and it can be for improving safety regulations. This model can be future extended for providing better living environment for people in and around industries with a pollution controlled environment.

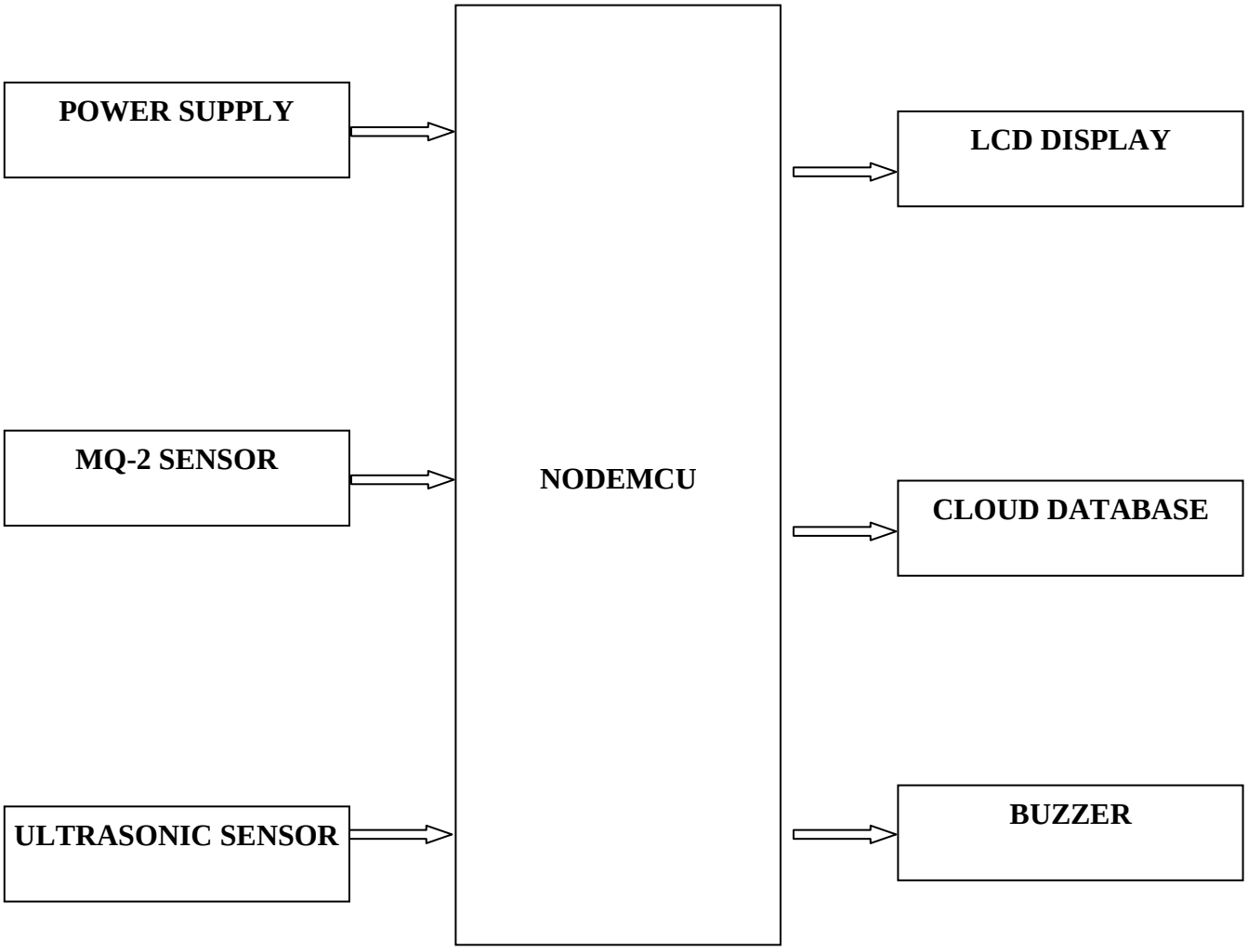
Title: toxic environment monitoring using sensor based on lot
Author : R.Rajalakshmi, J.Vidhya
Abstract:

The system planned in this paper is an excellent result for observing the toxic gases in hazardous environment for safety applications and generate the information visible anyplace within the world. The technology behind this Web of Things is advanced and is efficient solution for connecting the devices to the web and to attach the complete world of things in a network. The system deals with monitoring and controlling the environmental conditions like carbon monoxide, methane, hydrogen, LPG and flammable gases with sensors and send this data to the cloud server and draw the sensor data as pictorial statistics. The data upgraded from the enforced system is accessible within the web from anyplace within the world.

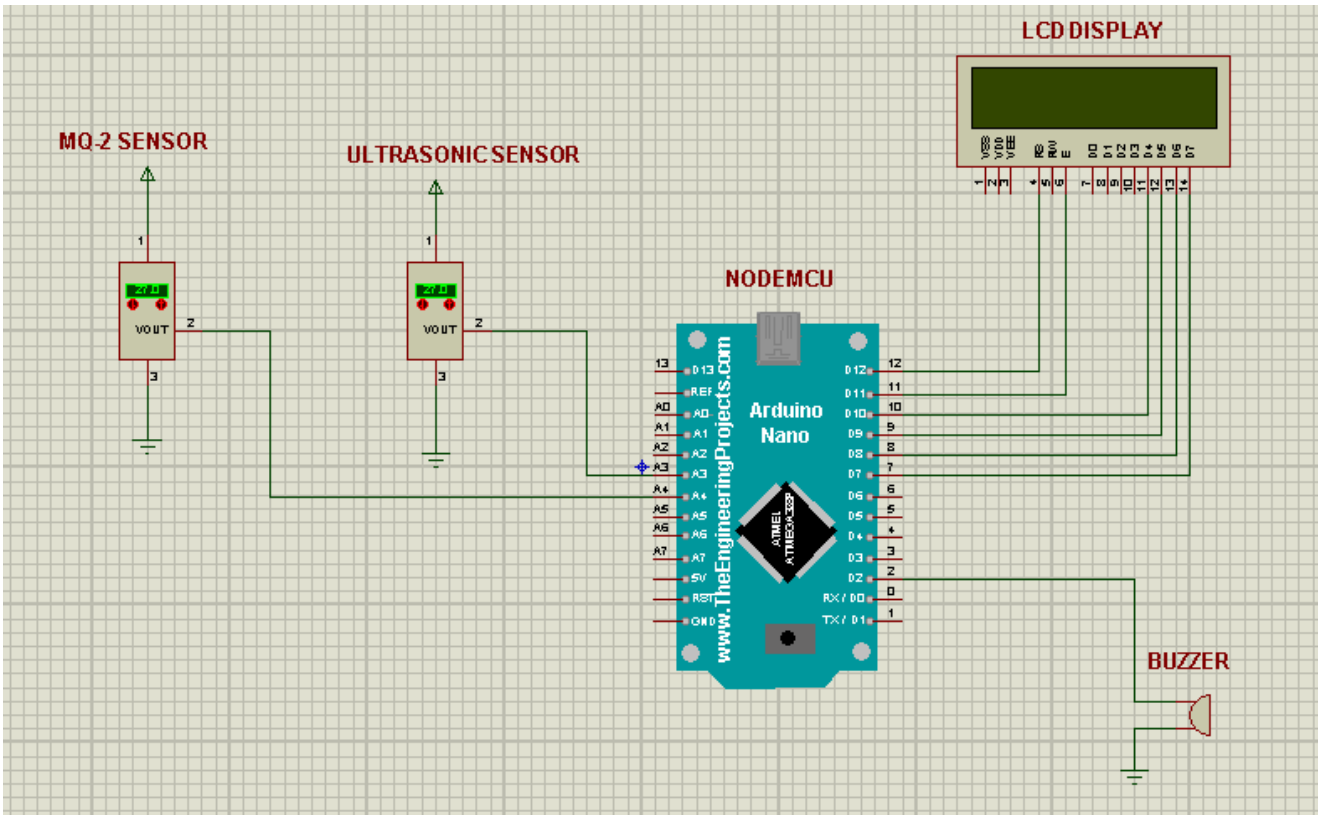
Title: A SURVEY ON TOXIC ENVIRONMENT MONITORING USING SENSORS
Author : R.Rajalakshmi, J.Vidhya
Abstract:

The level of contamination has increased with times by lot of factors like the increase in population, increased vehicle use, industrialization and urbanization which results in harmful effects on human wellbeing by directly influencing health of population exposed to it. Poor environmental conditions can lead to severe health problems. Nowadays people are affected by harmful gases in perilous environment. The important of this paper is observing harmful environmental conditions for safety applications. In this paper we detailed a survey on toxic environment monitoring based on different technologies using sensors.

BLOCK DIAGRAM



CIRCUIT DIAGRAM



WORKING PRINCIPLE

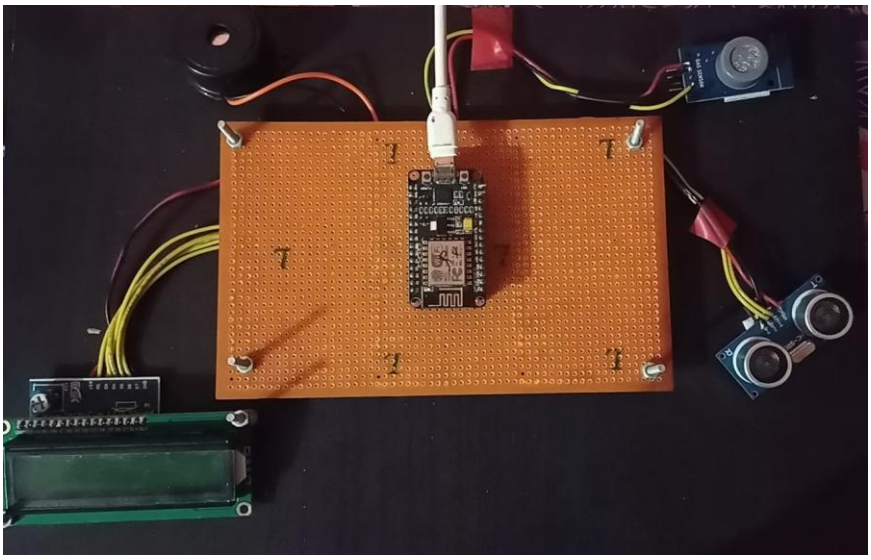
The poisonous gas and radiation or leakage monitoring process of the framework noticeable with the significance of real-time identification and control of the toxic gas and radiation, In this way as will automate the monitoring and controlling structure for real-time use. This framework is utilizing constrained gases sensor and restricted radiation sensor.Gas sensors (MQ7 SENSOR,) are used to monitor the toxic gases in soak pit.Ultrasonic sensor is used to monitor waste accumulated inside the soak pit. These sensors gather information and transmit data to IOT using Wi-Fi module. Most dangerous area accidents happen time intimated information sending speed is high. IoT module utilizing transmitting and accepting information reach is high and extendable as possible. If gas sensor, ultrasonic sensor, sense the value above threshold level automatically buzzer alarm will be on and the detected values will be sent to LCD display and Admin will get an ALERT through WIFI Module.

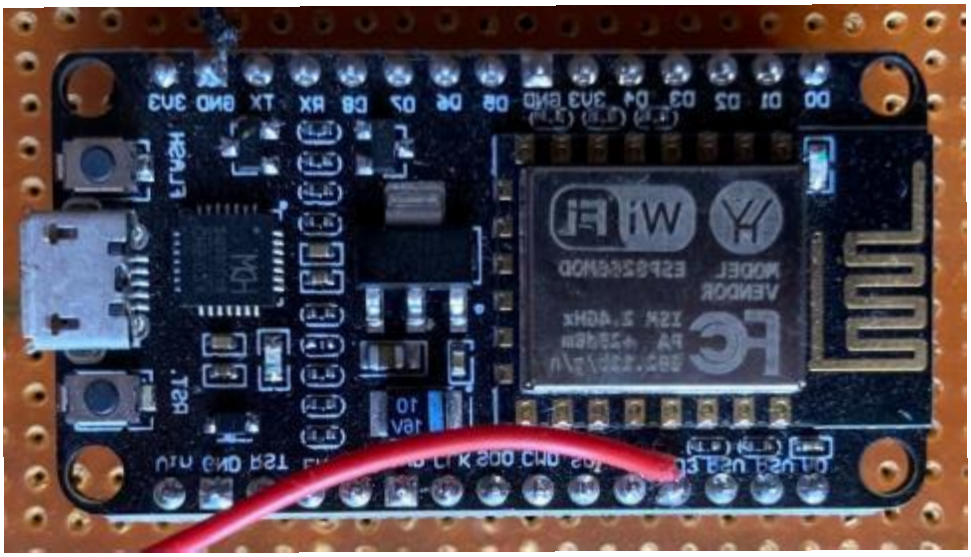
COMPONENTS DETAILS

HARDWARE CONFIGURATIOS

- NODEMCU
- Power supply
- Mq-7 gas sensor
- Ultrasonic sensor
- LCD Display
- WIFI Module
- Buzzer

NODE MCU WITH WI-FI MODULE





NodeMCU ESP8266 Specifications & Features

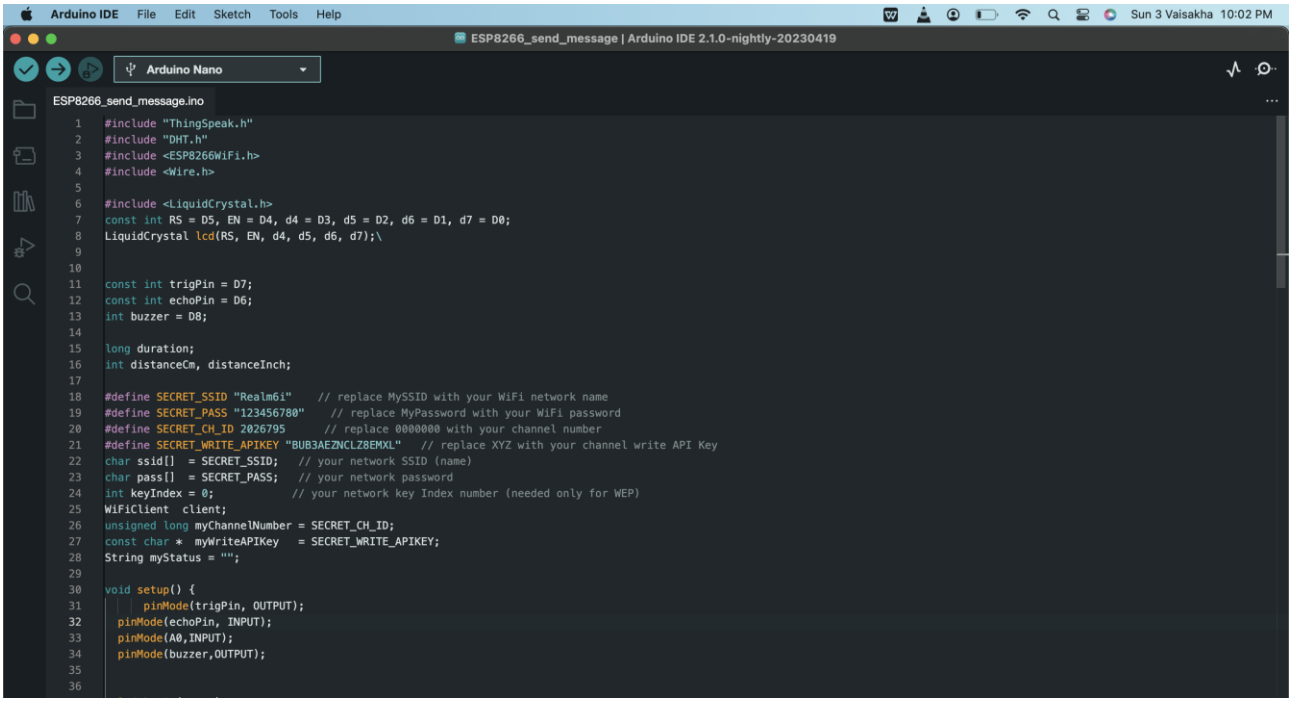
- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
- PCB Antenna
- Small Sized module to fit smartly inside your IoT projects

FEATURES

- Low cost, compact and powerful Wi-Fi Module
- Power Supply: +3.3V only
- Current Consumption: 100mA
- I/O Voltage: 3.6V (max)
- I/O source current: 12mA (max)

- Built-in low power 32-bit MCU @ 80MHz
- 512kB Flash Memory
- Can be used as Station or Access Point or both combined
- Supports Deep sleep (<10uA)
- Supports serial communication hence compatible with many development platform like Arduino
- Can be programmed using Arduino IDE or AT-commands or Lua Script

ARDUINO IDE



POWER SUPPLY

MQ-7 SENSOR

MQ7 Gas sensor is another one of Metal Oxide Semiconductor (MOS) type Gas Sensor of MQ Gas Sensors family involving MQ 2, MQ 4, MQ 3, MQ 8, MQ 135, etc. It is mainly used to detect Carbon Monoxide. This sensor contains a sensing element, mainly aluminum-oxide based ceramic, coated with Tin dioxide (SnO2), enclosed in a stainless-steel mesh. Whenever CO gas comes into contact with the sensing element, the resistivity of the element changes. The change is then measured to get the concentration of the gases present. The MQ7 Sensor has a small heating element present which is needed to preheat the sensor to get it in the working window. It can detect Carbon Monoxide Gas in the range of 20 PPM to 2000 PPM in the air. It finds uses in Alarm application in case of CO gas concentration build-up in the home or your car as CO is a very harmful gas and can kill a person if present over 300PPM.

ARDUINO

- VCC ↔ 2.5V ~ 5.0V
- GND ↔ power supply ground
- AOUT ↔ MCU.IO (analog output)

- DOUT ↔ MCU.IO (digital output)

SPECIFICATIONS

- Operating Voltage is +5V
- Can be used to Measure or detect CO
- Analog output voltage: 0V to 5V
- Digital Output Voltage: 0V or 5V
- Stable, Long life and Low Cost
- Fast Response time
- Heater consumption about 350mW
- The Sensitivity of Digital Output pin can be varied using the potentiometer

APPLICATIONS OF MQ7 CO GAS SENSOR

- Domestic gas leakage detector
- Industrial CO detector
- Portable gas detector

ULTRASONIC SENSOR

MODULE OPERATING PRINCIPLE

Set low the Trig and Echo port when the module initializes , firstly, transmit at least 10us high level pulse to the Trig pin (module automatically sends eight 40K square wave), and then wait to capture the rising edge output by echo port, at the same time, open the timer to start timing. Next, once again capture the falling edge output by echo port, at the same time, read the time of the counter, which is the ultrasonic running time in the air. According to the formular: test distance = (high level time * ultrasonic spreading velocity in air) / 2, you can calculate the distance to the obstacle.

INTERFACING PINS:

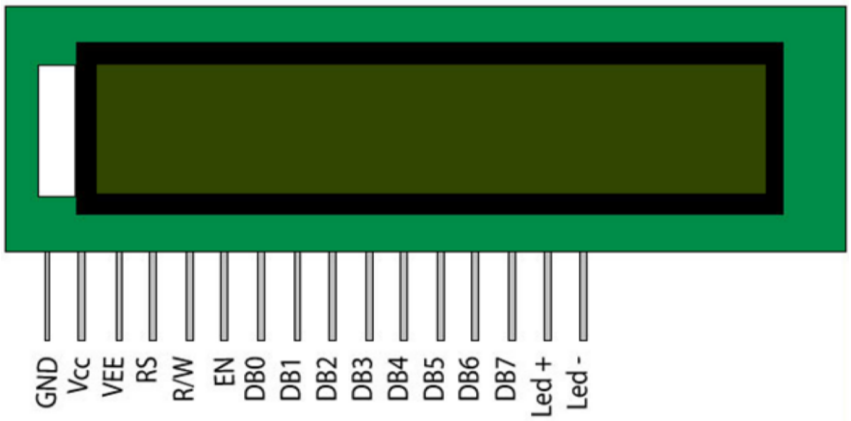
- 5V Supply
- Trigger Pulse Input
- Echo Pulse Output
- 0V Ground

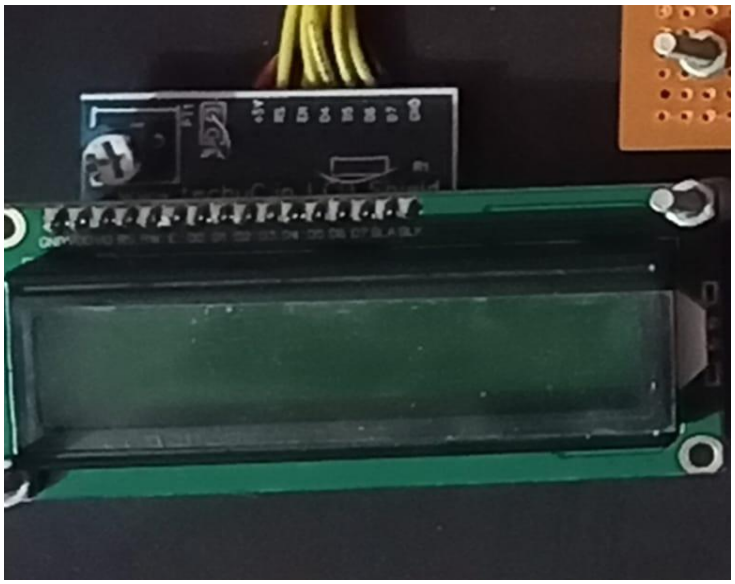
SPECIFICATIONS

- Power Supply: 5 Volts
- Interface Type: Analog & Digital

- High Sensitivity to Smoke & combustible gasses like Hydrogen, LPG & Propane.
- Low Cost.
- Stable & Long Life.
- On board Power indication.

LCD DISPLAY





Features of LCD 16x2

The features of this LCD mainly include the following.

- The operating voltage of this LCD is 4.7V-5.3V
- It includes two rows where each row can produce 16-characters.
- The utilization of current is 1mA with no backlight
- Every character can be built with a 5×8 pixel box
- The alphanumeric LCDs alphabets & numbers
- Is display can work on two modes like 4-bit & 8-bit
- These are obtainable in Blue & Green Backlight
- It displays a few custom generated characters

BUZZER

Working Principle

The working principle of a buzzer depends on the theory that, once the voltage is given across a piezoelectric material, then a pressure difference is produced. A piezo type includes piezo crystals among two conductors.
Once a potential disparity is given across these crystals, then they thrust one conductor & drag the additional conductor through their internal property. So this continuous action will produce a sharp sound signal.

FEATURES

- Input supply: 5 VDC
- Current consumption: 9.0 mA max.
- Oscillating frequency: 3.0 ±0.5 KHz
- Sound Pressure Level: 85dB min

CONCLUSION AND FUTURE SCOPE

In this work, an intelligent system for harmful gas and radiation detection checking to caution has been created to overcome the disadvantage looked in further conventional systems through using Wi-Fi module and IoT. Hence the use of serial correspondence makes the

framework with an controller and IoT. The IoT door associate remote sensor connects with the web, assurance the operation of the gas and alcohol observing framework. It used a just constrained sensor. The created application also used for checking gas and radiation in android portable.

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