



Poisonous GAS and Radiation Detection Monitoring using Internet of Things

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Abstract:

The industries related disasters every year increases that reason causes in security the human life. Industries disasters avoiding using developed poisonous gas and radiation detection monitoring system in Internet of things. This project intended to avoid industries accident and monitoring the pollution control board using arduino Uno r3 and internet of things. Arduino Uno r3 board is used as central microcontroller which is connected with sensor. Such as temperature, gas sensor, radiation sensor. Sensor to get the data from environment. Hence this device may be used as multi gases and radiation detection apparatus more over the rate of response is high. The programmed tested with harmful gases and radiation leakage which resulted in quick response. An alarm is produced instantly if the level of the gases and radiation goes above the normal level means indication through the internet specific receiver section. Sensor getting every data is stored in internet. which can be used for further processing and it will be good start for industries surrounding living people secure and helps in terms of reduction in industries disasters and pollution control environment.

Keywords: Arduino Uno r3, gas sensor, radiation sensor, wifi module, internet of things

1. INTRODUCTION

Industries started peoples or industries owner fully focus on the profit oriented. They do not focus on the workers, people safety and environment safety also. Developed countries built industries, company proper follow but in developing countries do not follow properly [6]. Generally industries are located in the outside cities. But some industries are located middle of the cities and village because transport reasons or company of raw material availabilities based. Initially industries are forming highly safety precaution based but sometimes accident occur industries like because of no proper maintain industries, human error ,components failure etc. This project used for monitoring and controlling hazardous environment, chemical industries, industries area [7]. Controlling & monitoring purposes using internet of things. Industrial safety industrial working people safety & industries surrounding living people safety to avoid major industries accident or any industries accident occurring time give alert warning to fire station, police station, hospital etc. Pollution controlling board monitoring also used this project.

HARDWARE SYSTEM OF PROPOSED

This system using limited gases sensor and limited radiation sensor these sensors are collecting data transmitting using Wi-Fi module to internet of things (iot) module. Most dangerous area accidents occur time intimated data sending speed is high must need. Iot module using transmitting and receiving data range is high and extendable as possible [1]&[2]. The poisonous gas and radiation monitoring system realized the real-time detection and control of the poisonous gas and radiation improved the ability of the automation and the intelligent of the poisonous gas and radiation detection monitoring [7].

II. RELATED WORKS

The existing system used zigbee module transmitting and receiving information data bit rate is 250 kilo bits per second

[6]. This system is mainly used wifi module transmitting and receiving information data bit rate is 54 mega bits per second. wifi module using getting information very quickly to reach desired designation or location peoples or related government officers.

Hard Ware Used

- Arduino Uno r3
- Mq2 gas sensor
- Mq7 gas sensor
- Mq135 gas sensor
- radiation sensor
- Alarm
- Temperature sensor lm35
- wifi module
- Iot module
- Lcd display

Software Used

- Arduino
- Proteus

MQ2 Gas Sensor

The MQ series of gas sensors use a small heater inside with an electro-chemical sensor. They are sensitive for a range of gasses and are used indoors at room temperature. The output is an analog signal and can be read with an analog input of the Arduino. The main objective of the overall system poisonous gas and radiation leakage identified. In case any toxin gases or radiation present in industries areas that gases or radiation mainly affected by the industries surrounding areas living peoples. Some gases continuous breathing means kill the human begin and environment mixed this gas or radiation polluted environment condition. If the gases are odourless they

will be exposed to it for a long time which may cause serious health problems. Gases like CO (carbon monoxide) are odourless which with concentration above 350ppm cause confusion and fainting, above it will surely kill individual. Each gas has its own physical and chemical properties, which make them difficult to analyse without any instrument. Toxic gases present in various levels depending on the concentration and density of it. Gas sensor working Gas molecule to absorb IR light each gas molecule absorption having particular wave length. Wavelength based identified gases. radiation sensor working It measure the number of counts striking per minute detected by the Geiber tube .temperature sensor sensing temperature condition this all sensor gathering data send to Arduino Uno R3 board. Arduino board micro controller already programmed that program that program operation based on gases and radiation monitoring level. Suppose getting sensor value level is high means indicated the nearest fire station, this indication based save industries surrounding people life. Device placed area having LCD display it display any leakage occurring time indication display. Wi-Fi module using transmitting data speed rate is high. Compare to zigbee module.

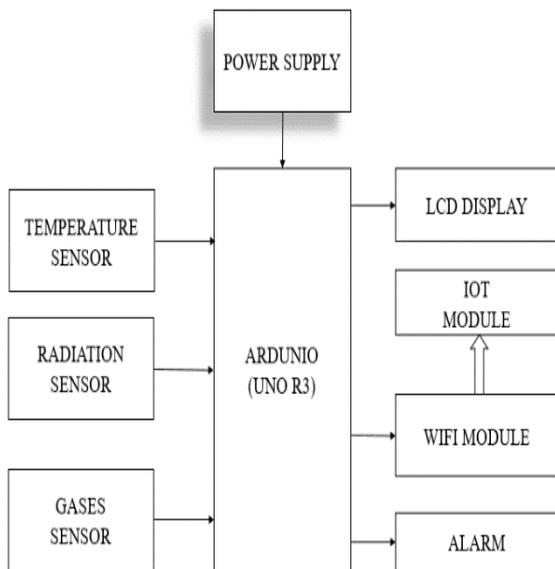


Figure. 1. Block diagram of System

The shield is designed based on esp8266 by Espressif Systems, pin-compatible with Arduino UNO/Mega2560 DevBoard. It is low cost Wi-Fi module suitable for adding Wi-Fi functionality to an existing microcontroller project via a UART serial connection. The module can be doing reprogrammed to act as a standalone Wi-Fi connected device—just add power! The feature list is impressive and includes: 802.11 b/g/n protocol Wi-Fi Direct (P2P), soft-AP Integrated TCP/IP protocol stack. The MQ-2 Gas Sensor module is useful for gas leakage detecting in home and industry.

MQ7 Gas Sensor

This is a simple-to-use Carbon Monoxide (co) sensor, suitable for sensing CO concentrations in the air. The MQ-7 can detect CO-gas concentrations anywhere from 20 to 2000ppm. This sensor has a high sensitivity and fast response time. The sensor’s output is an analog resistance.

MQ135 Gas Sensor

Sensitive material of MQ135 gas sensor is SnO₂, which with lower conductivity in clean air. When the target combustible gas exist, the sensor’s conductivity is higher along with the gas concentration rising. Please use simple electro circuit, Convert change of conductivity to correspond output signal of gas concentration.

Temperature Sensor LM 35

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1/4°C at room temperature and ±3/4°C over a full –55 to +150°C temperature range.

Wi-Fi Module

ESP8266-Based Serial Wi-Fi Shield for Arduino is designed and developed by Shenzhen Doctors of Intelligence & Technology (SZDOIT). Finally Cloud Server will apply data mining on data sets. It also mail or SMS Technician and send details to the Owner (mail or SMS). We can connect any number of users on cloud server so it supports multi user system characteristics. Here we can use only one cloud server but we can connect many numbers of users to it via pc, or any android devices

Radiation Sensor

Primary ionization must be preserved and not be lost to recombination by electro negative atoms. The energy resolution of the detector will the detector measure the energy of the radiation striking. Striking radiation ions collected then formed electrical signal. This electrical signal amplified to observed radiation value.

LCD Display

The LCD (Liquid Colour Displays) for Arduino provides a simple communication between the user and the electronic system in an easy and understandable language. For any microcontroller, reading and writing the characters to the LCD is the priority task, and among of microcontrollers, Arduino is the best. Arduino is a great platform for prototyping to interface the LCD displays, actuators, sensors, etc. Depending on your needs and requirements.

IOT Module

We use different sensors (light, temp, and level, humidity) to collect the data to understand the environmental conditions and also to detect any fault in devices. It is necessary to act devices according to the inhabitant requirement. Home PC continuously monitors sensors values and control the devices accordingly. If problem found it report to cloud server. Here user can modify some settings and see the devices functionality and working. We build one Registration Application where Technicians and other service provider will register on it. They are provided service timing etc.

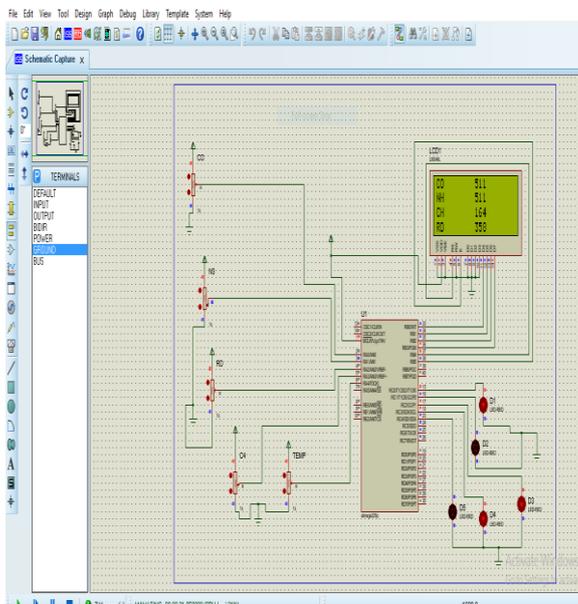


Figure.4. The proteus software using simulation output of lcd

Table.1. Condition for monitoring

NO.	Parameters	Range
1	Methane	990 ppm
2	Carbon monoxide	100 ppm
3	Ammonia	250 ppm
4	Radiation	150 rem
5	Temperature	320° C

IV. CONCLUSION AND FUTURE SCOPE

In this work an intelligent system for poisonous gas and radiation detection monitoring alerting has been developed to overcome the disadvantage faced in older methods by using wifi module and internet of things. Thus the usage of serial communication makes the system with Arduino controller and iot. The iot gateway connect wireless sensor network with the internet, ensure the operation of the gas and radiation monitoring system. It used only limited sensor. Developed app also used for monitoring gas and radiation in android mobile.

V. REFERENCES

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