Toxic Gas and Radiation Detection Monitoring Using IOT

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ABSTRACT—Industries disasters every increases that reason in security the human life. Reduces Industries disasters developed one device having poisonous gas and radiation detection monitoring system with in Internet of things. This project intended to avoided industries accident and monitoring the pollution control board. 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 at the leakage time. This device used for as multi gases and multi radiation detection as possible. The program tested with single or multi harmful gases and radiation leakage which resulted is quick and response time is high. An alarm is used produced sound signal alert by industries areas surrounding living people. if suppose level of the gases and radiation goes above the normal level means indication through the internet particular website and as well as indicated android app. Initially system developed th at time create one webpage and android app. Multiple number of user also see this data about radiation and gases leakage main added advantages. Sensor getting every data is stored in internet corresponding website. which can be used for further processing and it will be good start for industries surrounding staying people secured in life.

KEYWORDS—Arduino Uno r3,gas sensor, radiation sensor, temperature sensor, Wi-Fi module, internet of things, website, android app .

I. 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 stationpolice station, hospital etc. Pollution controlling board monitoring also used this project.

Wi-Fi module to internet of things (Iot) module. Most dangerous area accident occur time intimated data sending speed is high must needed. 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]. T his system is mainly used Wi-Fi module transmitting and receiving information data bit rate is 54 mega bits per second. Wi-Fi 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 count sensor**
- **Alarm**
- **Temperature sensor lm35**

- **Wi-Fi module**
- **IOT module**
- **LCD display**
- **Website**

Software Used

- **Arduino**
- **Proteus**
- **Android App**

HARDWARE SYSTEM OF PROPOSED

This system using limited gases sensor and limited radiation sensor these sensor are collecting data transmitting to iotmodule.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. Certain toxic gases are continuous breathing intake human body continues causes may be goes to death. If the some gases are odourless they will be exposed a long time which means cause very serious health issues problems. Depends upon based varying gases and radiation detection .this device choose of gases and radiation in devices like CO, ammonia, methane & infrared radiation.CO (carbon monoxide) are odourless which with concentration above 150ppm cause disorientation confusion, nervous damage, coma and fainting, above it will surely kill individual. Each and every 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 like gas molecule to absorb the gas sensor generated heat that heat convert in to electrical signal. Initially sensor detect small amount of gas leakage After leakage amount is large go the harmful condition is high means produced electrical signal to arduino board. radiation sensor working like it measured the number of counts striking per minute detected by radiation sensor. Temperature sensor sensing room temperature condition. These sensor gathering data send to Arduino Uno R3 board. Arduino board micro controller already programmed that program operation based on gases and radiation monitoring level detection. Suppose getting sensor value level is high means in arduino board one pin connected to alarm it produce sound alert by industries people, the nearest fire station, police station. this indication based saved industries surrounding people life move safe place. Device having LCD display it display any leakage occurring time indication display in Lcd. Arduino board getting data transmitted to Wi-Fi module or Ethernet module through connect to internet. Module IP address know means any one can see the information data. Create A website see all information any risk data means highlighting. Android app also create install in mobile open the app see the normal and abnormal data. Abnormal data indication alert by user .web page data access see many peoples means set multi user it prevent human begin life.

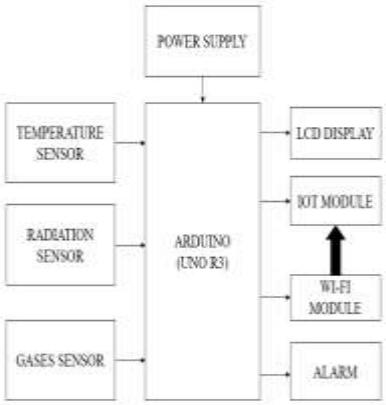


Figure 1. Block diagram of System

MQ2 Gas Sensor

The MQ 2 gas sensors inside a small heater is there with an electro-chemical sensor. Heater produce electrical current to arduino board. They are sensitive for a range of gas and are used indoors closed room at room temperature. The sensor output is an analog signal read by analog input pin of the Arduino board. The MQ-2 Gas Sensor module is useful for gas leakage detecting in home and industry. mq2 sensor sense methane in this device

MQ7 Gas Sensor

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. The MQ 7 gas sensors inside a small heater is there with an electro-chemical sensor. Heater produce electrical current to arduino board. The sensor output is an analog signal read by analog input pin of the Arduino board.

MQ135 Gas Sensor

The sensor's conductivity is more higher along with the gas concentration rising.electrocircuit, Convert change of conductivity to correspond output signal of gas concentration. The MQ 135 gas sensors inside a small heater is there with an electro-chemical sensor. Heater produce electrical current to arduino board. They are sensitive for a range of gas and are used indoors closed room at room temperature. The sensor output is an analog signal read by analog input pin of the Arduino board. Mq135 sensor sense ammonia in this device.

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 an advantage over linear temperature sensors calibrated in the Kelvin. The LM35 does not require any external calibration to provide typical accuracies of ±1⁄4˚C at room temperature and ±3⁄4˚C over a full −55 to +1 50˚C temperature range. It sense temperature in closed room areas.

Wi-Fi Module

ESP8266-Based Serial Wi-Fi Shield using Arduino board . Finally Claud Server will apply data mining on data sets. It also mail or SMS Technician and send details to the specific user (mail or SMS). We can connect any number of users on cloud server so it support multi user. The shield is designed based on esp8266 by Espress if Systems pin-compatible with Arduino UNO/Mega2560 DevBorad. 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 do 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. Wi-Fi module using data transmitting speed rate is high. compare to zigbee module. wifi module 54mb/s and zigbee module is 250kb/s.

Radiation count Sensor

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 elecrtical signal amplified to observed radiation value.

LCD Display

The LCD (Liquid Colour Displays) to connect Arduino board. It provides a very easy communication between the user and the electronic system in an easily and understand language. For any microcontroller, reading and writing the characters to the LCD. Lcd is represent output data by columns and rows. It is the priority task and among of microcontrollers Arduinois the best. Arduino is a greatplatform for prototyping to interface the LCD displays.

IOT Module

Today we are living in the iot era. This project using sensor collect the data to continuously send to arduino board and arduino recevier section transmitted data to wifi module to iot.Iot having webpage and android app.Iot using main advantages is large user set and one iot communicated another iot devices easily with out human interference .Any data uploading information send through iot as possible no needed humanbegin.We build one Registration Application where Technicians, and other service provider will register on it. They are provide service timing etc.

Figure 2. various Icon using Iot

Figure 3.Iot using Areas

ALARM

The alarm or buzzer using this system main reasons is indicated to alert working people and staying people moved safety place save the people life and environment

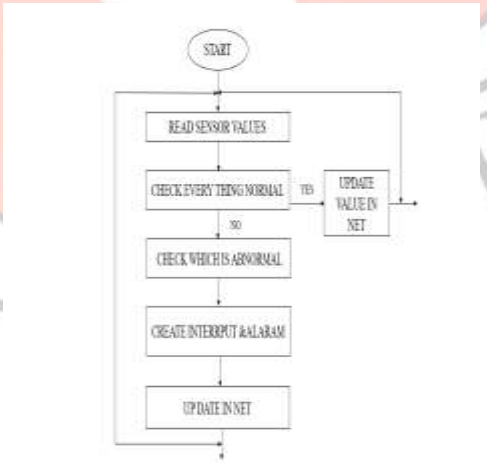
Power Supply

The arduino board can operate power supply range on the 5v input limit only applies to board. That power is 5v to reduces comes from 3.3volt also operate board. If power supply more than 12V means overheat and may be damage the board. Two terminals one is positive to connected Vin arduino board and other end terminal is negative to connected ground arduino board.

Arduino board give power initially board with led blink we need toggle switch in series connectedwith this battery so that you can turn your Arduino on and off. Another via power supply provided by Arduino board using USB cable coming from the computer. autonomous and powered by a battery. To power the Arduino, you will need a battery. The best is to power the Arduino directly from the battery.

ALGORITHM

The sensors measured the values is normal means directly update internet not used alarm .In case sensor measured values is changes means alarm activated and update internet.



PROTEUS 8.0 PROFESSIONAL

Proteus 8.0 professional is a best simulation for various design with arduino Uno r3.It's mainly popular because of availability of almost all microcontroller in it. So it's handy tool to test programs & embedded design for electronics hobbyist. You can simulate your programming of arduino Uno r3 in Proteus 8.0 Simulation Software. After simulating your circuit in Proteus 8.0 Software . Proteus is a virtual System Modelling & circuit Simulation application. Proteus also has the ability to simulate the interaction between software running on arduino Uno r3 and any analog or digital electronics connected to it . It simulates Input/ Output ports, interrupts, timers USART & all other peripherals present on each support processor.

RESULT

Model has been simulated by using by Proteus Software to monitor the poisonous gas and radiation detection using differentsensors. The change in, carbon monoxide, ammonia, radiation, methane will be detected by respective sensors and can be determined.

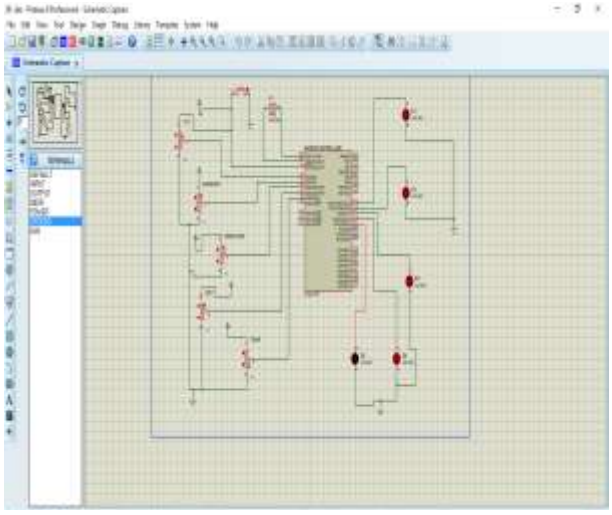


Figure4. proteus softwareusing simulation output of LED

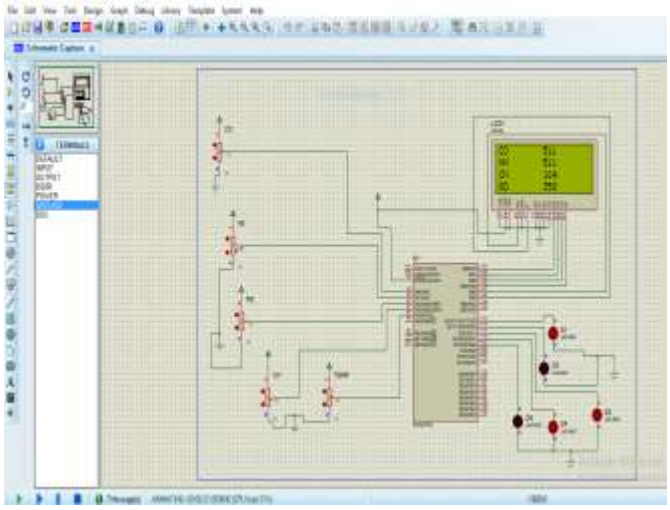


Figure5. proteus software using simulation output of LCD

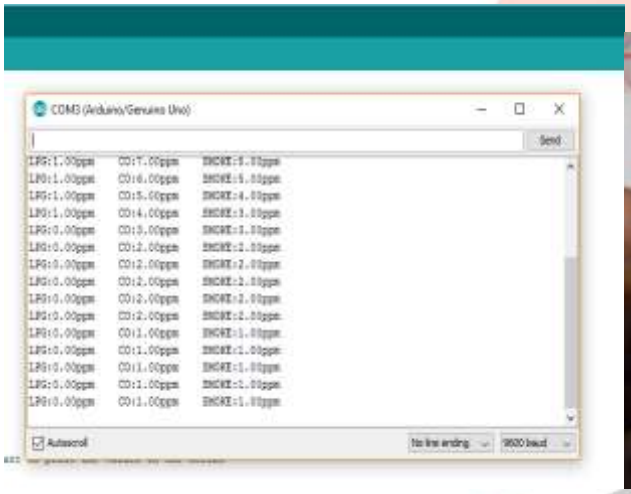


Figure6. Mq2 gas Sensor Caliibration Output Display

Figure7. Hard ware Output of co gases in LCD

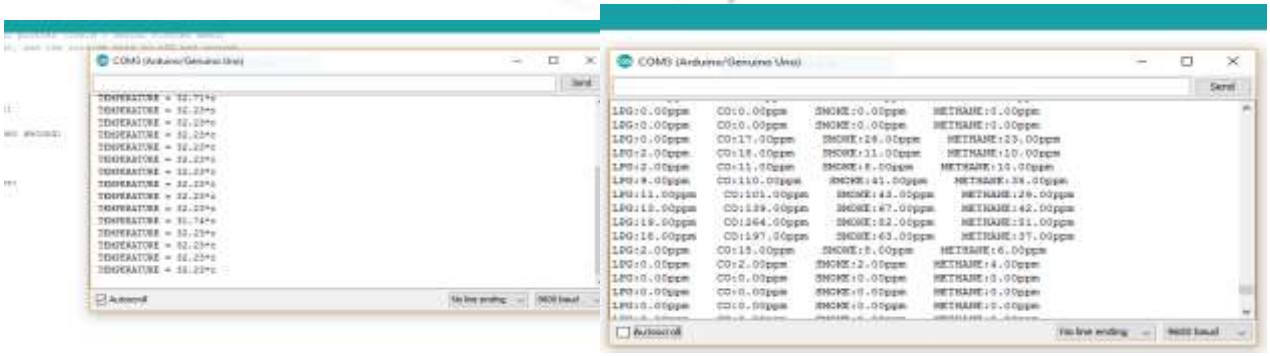


Figure8. LM35 Temperature Sensor output

Figure9. Mq2 gas Sensor of methane gas Output

Figure10. Website Page **Figure11.Android App Icon**

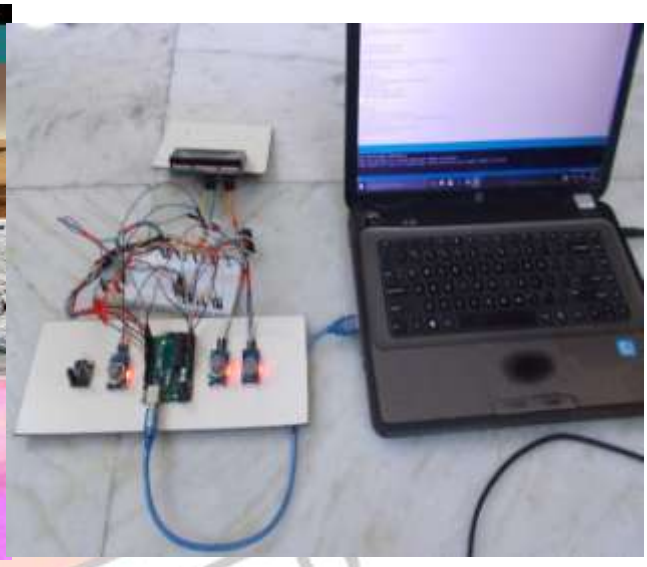


Figure12 . Android App View Page **Figure13.Experimental setup output**

Table1. 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

CONCLUSION AND FUTURE SCOPE

In this work an intelligent system for poisonous gas and radiation detection monitoring system has been programmed. Thus the usage 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. Examine gases and radiation leakage time how it was working design system analysis leakage time indication the people and workers move to safe place. Before accidient occurring time prevention people and workers from safely escaping dangerous situation and saving human life avoided major disasters.It used only limited sensor. Developed app used for monitoring gas and radiation in android mobile. The design of the system poisonous gases and radiation is implemented with low cost. Industries disasters related research oriented purposes used. its user friendly device.

The ongoing and future work is concentrated on the improvement sensors used more highly sensitivity sensors and improve information transmitting speed is high. Iot module has been developed with website and android app that app include more website as possible every sensor having individual web page create as possible. Iot is emerging market field in the future. IOT platform using devices improve the performance Moving robot , inspection robot ,flying robot traffic light etc. This iot concept implemented in most of devices . IOT using upgrading developing device doing now days.Additional features such as sense oxygen level, toxin gas mixed contain in environment range and sensor based controlled any device using iot based application .

Industries located surrounding areas living peoples also do the monitoring industries releases and leakage gases and radiation ranges levels.

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