HAZARDOUS AREA MONITORING FOR INDUSTRIAL PLANT POWERED BY IOT

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Professional Readiness for Innovation, Employability & Entrepreneurship

A Project Report

Submitted by

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1.INTRODUCTION:

1.1 PROJECT OVERVIEW

In some industrial plants, there are some areas which are to be monitored from time. Sometimes the condition become critical which may leads to loss of property and else human loss and to monitor the condition we can integrate the smart devices in the areas which are needed to be monitoring .Every device will be acting as a beacons and it is connected to temperature data along with the location of that particular area through beacons. After a plant grown into a feet it is placed into an intelligent monitoring system. Plants are monitored and controlled by mobile phone using mobile application. Errors in system are mainly due to improper monitoring of this system. So plant growth is affected. To overcome this problem the parameters are monitored by using exceeds its limit then the alarm is put on, simultaneously the concentration of all gases are displayed in the LCD display The proposed system is placed in an industry where the hazardous gases have to be monitored. The individual sensors are placed to read the range of gaseous concentration in ppm. Each sensor is sensitive to its own specific gas. These sensor values are read by the microcontroller, and then it is programmed to monitor the range of all gases. When the concentration of any gas**.**

0.72% to 10.74% of all kitchen accidents. The small LPG cylinder of weight 5kg in which the burner is located immediately over the cylinder without using a rubber tube is seen to be safer than the one which uses a rubber pipe as this subway has the hazards of getting cracked which in turn can make way to leakage [3]. In this research, a computer program running online was created to detect leakage locations and act as an automatic supervisor in remote areas; simple gas leak detector is a simple device that is used to detect the leakage of gas and if the gas leak occurs, an equivalent message is conveyed by the means of a buzzer and powered by Wi-Fi, it is capable to broadcast messages to the stakeholders about the LPG leak through the cloud which is based on the IoT technology; where -IoT is defined as a system that permits the devices for communicating with each other directly without human intervention [4]-. The proposed system will continuously monitor the environment for any leakage. Just

in case of any leakage detection, it'll alert the user via a buzzer and by using the ESP2866 wifi microcontroller and an IOT platform ; it'll alert the user about the environmental conditions to the gas level of that location of IBM cloud (as mentioned previously) notification.

1.2 PURPOSE

In every day many people are facing some industrial hazards like fire hazards, chemical exposure. It causes workers have physical and psychological problems in industrial plants. Any industry in the world. Which work make a electricity and other efficient products for peoples. So, we cannot avoid these industrial plants, but we can control the risk of power plants. Because we using automatic alarm based on IoT. Create mobile application it works detect the fire hazard and gas leak aging level in the industry. We using IoT device and web application it can protect the workers and protect the physical equipment's of the plant. This intelligent device can help to growth of industries and improve the security protection basics of IoT make automation and give solution to the risks. Tish IOT integrated with controller and sensors for intelligent monitoring and controlling purposes like avoid hazards in industrial sides. System is made automated through IOT which improves the efficiency and reduces the efforts and it reduce hazards fire, burn, gas leakage, toxic gases, explosion, physical problems of peoples and industry**.**

KEYWORDS: Hazardous, IBM Cloud platform, LPG, Alarm system.

2.LITERATURE SURVEY:

2.1EXIXTING PROBLEM

The need to industrialize to compete with global standards is a complete requisite to realize a booming economy.However, there is no question that it has wreaked havoc on the environment caused industrial emissions of dangerous chemicals. This study aimed to create a system that will allow Industrial plants and factories to monitor the emission of the smoke stacks. But leakage can take place through pipes or regulators or knobs which may cause accidents like suffocation, uneasiness or sometimes.The existing system in gas leakage detection is done using microcontroller.This system contains only few application like gas leakage detection and producing an alarm signal whenever gas leakage is detected.

2.2REFERENCES

1. S. Gruner, M. Hornacek, G. Bachinger, J. Rotroff, S. Cordes and A. Fay, Cross-Industry State of the Art Analysis of Modular Automation, Automation 2020: Shaping Automation for our Future 2375, pp. 899-914 (2020). DOI: 10.51202/9783181023754-899.

2. Maar if and S. Sharifah, Compact Portable Industrial Automation Kit for Vocational School and Industrial Training, IOP Conference Series: Materials Science and Engineering 384, p.012011 (Bandung, Indonesia, 2018). DOI:10.1088/1757-899X/384/1/012011.

3. L. Medina, R. Silva and Z. Soto, Industrial Engineering from the Vision of a Portable Automated Model, LACCEI 13th edition (Santo Domingo, Dominican Republic, 2015). DOI:10.18687/LACCEI2015.1.1.072

4. Y. Feng, C. He, J. Tan, H. Zheng and Y. Gao, Assessment of the Design Complexity of Modular Automated Assembly System, Ameches (Hanoi, Vietnam, 2020). DOI:10.1109/ICAMechS49982.2020.9310121

5. P. Alvarado-Velasco and V. Ayala-Ramirez, Methodology for modular automation system design, CONIELECOMP 21st edition (San Andres Cholula, Mexico, 2011). DOI:10.1109/CONIELECOMP.2011.5749338.

6. Harsh N. Shah, Zishan Khan, Abbas Ali Merchant, Moin Moghal, Aamir Shaikh, Priti Rane, “IOT Based Air Pollution Monitoring System”, International Journal of Scientific & Engineering Research, Vol. 9, Issue 2, Feb.2018, pp. 62-66

7.MSHA (2017) Accident/injury/illness: machinery/power Haulage data, 2001–2016.

8.International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429 Volume 9 Issue VII July 2021- Available at www.ijraset.com.

2.3PROBLEM STATEMENT DEFINITION

Create a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love.

A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.

3.IDEATION & PROPOSED SOLUTION:

3.1 EMPATHY MAP CANVAS

3.2 IDEATION & BRAINSTORMING:

Step-2: Brainstorm, Idea Listing and Grouping

3.3 PROPOSED SOLUTION

In industrial areas fire accidents can be prevented by fire detection using temperature and gas sensors. Harmful or toxic gas leakages can identified. By the use of wireless technology, information from these sensors can be broadcasted to the particular individual. Alert message are sent via an application and buzzer sound is enabled.

A versatile modular monitoring equipment for the proactive diagnosis and monitoring of a wide range of industrial equipment [2, 3] is becoming more and more useful. Automation systems have started to be modularized in order to be able monitor a wide range of equipment (such as compressors, electric motors, gas turbines, blowers etc.) A properly designed automation cabinet [4, 5] can increase productivity, lowers costs, and ensure processes reliability.

This application has a powerful impact not only on the people but also on the environment.By using this application ,individuals are alerted incase of danger or threat.Thereby environment as well as thousands of life can be saved which inturn causes contentment.

Industrial plans are the one that contain both hazardous and non-hazardous

area .The monitoring of the hazardous area in industrial plants in important from time to time.If the damage that occurs in hazardous areas can result in the loss of property or lives.So monitoring for Industrial plants is a project that focuses on the necessity of the monitoring of hazardous area in industrial plants .There can be smart devices integrated at the hazardous area that can help in detecting any fishy things that can occur in the particular area.The software needs to monitor the temperature parameters of the hazardous area in industrial plants.

The uniqueness of our application we will get live updates of temperature,humidty and radiation in and around the workers environment using IoT

3.4 PROPOSED SOLLUTION FIT

4. REQUIREMENT ANALYSIS:

4.1 FUNCTIONAL REQUIREMENT

In infrastructure and industrial plants the rapid growth is creating environmental issues like pollution, climate change and malfunctioning. It has a great consequence for the requirement of an operationally adaptable, efficient,

cheap and smart monitoring systems. For this purpose we come up with idea to use these kind of technology the Internet of Things (IoT) inform of a solution. In this paper, we suggest wireless data gathering frameworks that enable each detector node to track the changes in the pattern of gases and to identify their role in gas leakage problem, whilst at the same time trying to minimize power consumption.

The sensor converts the physical quantity into the voltages, when concentration increases the input voltage to microcontroller through sensor is also simultaneously increases

HARDWARE REQUIREMENTS:

- Alarm
- Fire sensor
- Gas sensor
- Driver
- Smart wearables
- Beacons

a) Alarm

The four ways your fire alarm system works to protect your property and its occupants from the dangers of fire are by detecting fire, alerting occupants, managing risk.

b) Smart wearable's

To inform the client around the temperature of the zone.

c) Beacons

Beacons are small, wireless ,battery operated sensors that are powered by Bluetooth low energy (BLE) technology that can detect and measure things like the temperature in a cold case, motion in a black room, the amount of items on a self, spills in the forecourt, of when a customer who signed into the store's mobile.

d) Cloud storage

To store and get to the information. Using IBM cloud server .installed by use.

e) Temperature sensor

Temperature sensors monitor about the surrounding temperature and give the alert when the temperature level exceeds.

f) IoT

Internet of things is the method that used for the mobile access of the system where ever we live.

Here we used to monitor about the system though microcontroller unit.

j) Mobile phone

Mobile phone used to view the monitoring of hydroponic system. Which operate through the IoT. Monitoring parameters are obtained in that mobile phone itself.

4.2 NON-FUNCTIONAL REQUIREMENTS

A non-functional requirement defines the quality attributes of a software system.It specifies “What should the software system do?” it places constraines on “How should the software system fulfil the functional requirements?”.In system engineering and requirements engineering a non functional requireements us a requireemnts that specifies criteria that can be used to judge the operation of a system, rather than specific behaviours. They are constrasted with non-functional requirements that define specific behaviour or functions. The pklan for implementing functional requirements is detailed in the system desigh. The plan for implementing functional requirements is detailed in the system architecture, because they are usually architecturally siginificant of non-functional requirements.

SOFTWARE REQUIREMENTS:

- Arduino IDE
- Microcontroller
- Power supply unit

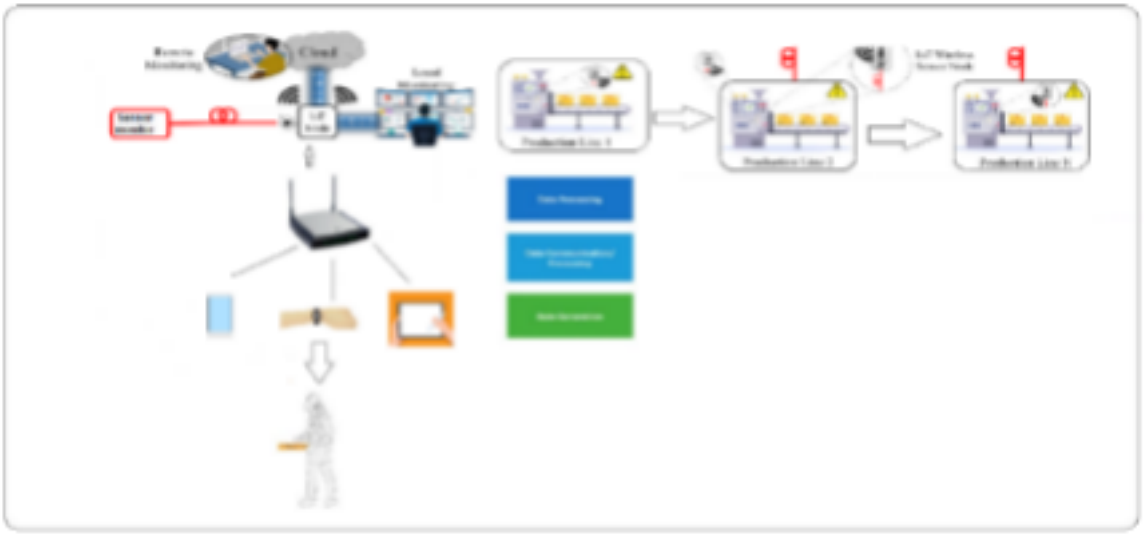
It consists of microcontroller (PIC 16F877A), gas sensor, weight sensor (Load Cell- L6D), GSM module (SIMCOM 300), and display(s). To monitor the LPG, **an efficient and fast working microcontroller** is required. The microcontroller also controls the working of the gas sensor and load sensor output.

5 PROJECT DESIGN:

5.1 DATA FLOW DIAGRAMS

5.2 SOLUTION & TECHNICALARCHITECTURE:

Solution Architecture



5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
	Data Modules	USN-2	As a Industry owner, I will receive message about the parameters.	I can receive confirmation email & click confirm	High	Sprint-1
	Login	USN-3	As a Industry owner, I can login into my account through email and password.	I can register & access my account.	Medium	Sprint-2
	Dashboard	USN-4	As a Industry owner, I can monitor the temperature and humidity	I can access my account.	Medium	Sprint-1
Customer (Industrial Worker)	Registration	USN-1	As a Industry owner, I can register in to the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
	Data Modules	USN-2	As a Industry owner, I will receive message about the parameters.	I can receive confirmation email & click confirm	High	Sprint-1
	Login	USN-3	As a Industry owner, I can login into my account through email and password.	I can register & access my account	Medium	Sprint-2
	Dashboard	USN-4	As a Industry owner, I can monitor the temperature and humidity	I can access my account	High	Sprint-1

6 PROJECT PLANNING:

6.1 SPRINT PLANNING & ESTIMATION:

6.2SPRINT DELIVERY SCHEDULE

6.3 REPORT FROM JIRA

7 CODING & SOLUTIONING:

7.1 FEATURE:1

```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random
#Provide your IBM Watson Device Credentials
organization = "97mai0"
deviceType = "Sivamadhavan23"
deviceId = "Sivamadhavanece"
authMethod = "token"
authToken = "I)&NoyRn-DUOO(*4yn"
```

```
try:

 deviceOptions = {"org": organization,"type": deviceType,"id":
 deviceId,"auth-method":
 authMethod,"auth-token": authToken}

 deviceCli = ibmiotf.device.Client(deviceOptions)
#.....

 except Exception as e:

print("Caught exception connecting device: %s" % str(e))

 sys.exit()


# Connect and send a datapoint "hello" with value "world" into
the cloud as an event of

type "greeting" 10 times

 deviceCli.connect()

while True:

#Get Sensor Data from DHT22

 Temperature=random.randint(0,100)

Humidity=random.randint(0,100)

 Gas=random.randint(0,100)

 data = { 'Temperature' : Temperature,'Humidity':
```

```
 Humidity,'Gas': Gas}

# print data

 def myOnPublishCallback():
print ("Published Temperature = %s C" %
 Temperature,"Humidity = %s %%" %

Humidity,"Gas=%s %%" % Gas,"to IBM Watson")
 success =
 deviceCli.publishEvent("IoTSensor","json", data,
 qos=0,

 on_publish=myOnPublishCallback)

if not success:

 print("Not connected to IoTF")

 time.sleep(10)
```

7.2 FEATURE:2

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#include "DHT.h"// Library for dht11
#define DHTPIN 15 // what pin we're connected to
#define DHTTYPE DHT22 // define type of sensor DHT 11
#define LED 2
DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin and
typr of dht connected
void callback(char* subscribetopic, byte* payload,
unsigned int payloadLength);
```

```
//-------credentials of IBM Accounts------
#define ORG "97mai0"//IBM ORGANITION ID
#define DEVICE_TYPE "Sivamadhavan23"//Device type mentioned in
ibm watson
IOT Platform#define DEVICE_ID "Sivamadhavanece"//Device ID
mentioned in ibm
watson IOT Platform #define TOKEN "I)&NoyRn-DUOO(*4yn"
//Token String data3;
float h, t;

//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server
Name char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type
of event perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd
REPRESENT command type AND COMMAND IS TEST OF FORMAT
STRING char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id

// -
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling
the predefined client id by passing parameter like server
id,portand wificredential

void setup()// configureing the ESP32
 {
 Serial.begin(115200);
dht.begin();
pinMode(LED,OUTPUT);

delay(10);
 Serial.println();
```

```
wificonnect();
mqttconnect();
}
void loop()// Recursive Function
 {
h = dht.readHumidity();
t = dht.readTemperature();
 Serial.print("temp:");
 Serial.println(t);
 Serial.print("Humid:");
 Serial.println(h);
PublishData(t, h);
delay(1000);
if (!client.loop()) {
mqttconnect();
}
 }

/*.....retrieving to
 Cloud. ..... */
void PublishData(float temp, float humid) {
mqttconnect();//function call for connecting to ibm
/*
creating the String in in form JSon to update the data to ibm
 cloud */
 String payload = "{\"temp\":";
payload += temp;
payload += "," "\"Humid\":";
payload += humid;
payload += "}";

 Serial.print("Sending payload: ");
 Serial.println(payload);
```

```
if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish ok");// if it sucessfully upload data on the
cloud then it will print publish ok in Serial monitor or else it will
print publish failed
} else {

Serial.println("Publish failed");
}
}

void mqttconnect() {
if (!client.connected()) {
Serial.print("Reconnecting client to ");
Serial.println(server);
while (!!!client.connect(clientId, authMethod, token)) {
Serial.print(".");
delay(500);
}
initManagedDevice();
Serial.println();
}
}
void wificonnect() //function defination for wificonnect
{
Serial.println();
Serial.print("Connecting to ");
WiFi.begin("Wokwi-GUEST","", 6);//passing the wifi credentials to
establish the connection
while (WiFi.status() != WL_CONNECTED) {
delay(500);
Serial.print(".");
}
```

```
 Serial.println("");
 Serial.println("WiFi connected");
 Serial.println("IP address: ");
 Serial.println(WiFi.localIP());
 }
void initManagedDevice() {
if (client.subscribe(subscribetopic)) {
 Serial.println((subscribetopic));
 Serial.println("subscribe to cmd OK");
 } else {
 Serial.println("subscribe to cmd FAILED");
 }
 }
void callback(char* subscribetopic, byte* payload, unsigned int
 payloadLength) {
 Serial.print("callback invoked for topic: ");

 Serial.println(subscribetopic);
 for (int i = 0; i < payloadLength; i++) {
//Serial.print((char)payload[i]);
 data3 += (char)payload[i];
 }
 Serial.println("data: "+ data3);
if(data3=="lighton")
 {
 Serial.println(data3);
digitalWrite(LED,HIGH);
 }
 else
 {
 Serial.println(data3);
```

8.1 USER ACCEPTANCE TESTING:

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	3	2	0	0	5
Duplicate	0	0	0	0	0
External	4	3	0	0	7
Fixed	2	3	0	0	5
Not Reproduced	0	0	0	0	0
Skipped	1	0	0	0	1
Won't Fix	1	0	0	0	1

3. Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	90	0	0	90
Client Application	5	0	0	5
Security	1	0	0	1
Outsource Shipping	3	0	0	3
Exception Reporting	0	0	0	0
Final Report Output	5	0	0	5

9.RESULTS:

9.1 PERFORMANCE METRICS:

The result of this project is determined by using a lighter to collect leaked gas around the gas sensor,after sensing procedure if sensor value is greater than the threshold value then ESP 8266(NODE MCU) will perform its programmed tasks : Immediately turn off the regulator knob to stop further leakage. After detecting the gas leakage, the relay will be on the Enhanst fan to prevent any further accidents. Buzzer starts beeping to alert the nearby people. The exhaust fan will fan out all enclosed gas from the environment. The wi-fi module updates the information to the cloud. The user can get to know the gas values and status of the system through the app and also control of the power supply can be done manually by the user through the app.

10.ADVANTAGES AND DISADVANTAGES:

ADVANTAGES:

The smart box has been developed as a prototype to measure the levelof air quality, dust, temperature, and humidity.

it is suitable to implement and apply in a smart city for the near future.

This will help companies in maintaining the machine Technology.and provide them emission data of gaseous elements such as carbon monoxide, particulate matter, sulfur and nitrogen dioxide that will help them in complying with the environmental standards of industrial emission.

- Get real-time alerts about the gaseous presence in the atmosphere
- Prevent fire hazards and explosions
- Supervise gas concentration levels
- Ensure worker's health
- Real-time updates about leakages
- Cost-effective installation
- Data analytics for improved decisions
- Measure oxygen level accuracy
- Get immediate gas leak alerts

APPLICATIONS:

Harmful Gas Detection:

The sensing of toxic gases such as H2S, Methane, and CO is of great importance in any industry to avoid unwanted leakage and consequences like poisoning or explosions. The presence of these gases can be easily detected in the industrial facilities and commercial buildings with the help of IoT-powered gas monitoring solution. Moreover, a gas detector or sensor device is a crucial part to carry out safe industrial operations. The sensor-enabled solution helps prevent the high risk of gas explosions and affecting any casualties within and outside the premises.

DISADVANTAGES:

It gets reacted due to heating of wire. ➨It measures toxic gases in very low concentrations. ➨It has ability to detect wide range of gases. ➨It is difficult to know failure modes unless very advanced methods of monitoring are used. ● It

causes suffocation, in case of leakage as it heavier than air.

- It is hazardous as it inflammable gas.
- It is consumed more as it has low energy density.
- It does not provide power to the vehicle in mountains or rough terrains. ● It is costlier than CNG.

11.CONCLUSION:

It is always better to have preventive measure, rather than taking actions after a disaster. Having a system to monitor the changes in the surroundings should help the owners of the industry to keep their industries safe and also keep their workers safe. Though the initial cost of installation of the device is higher, it is always better to spend on precaution, than spending on fixing any harmful situation.

FUTURE SCOPE:

Another major future scope could be including a Automatic Shut-off device which will turn off the gas supply whenever it will detect any gas leakage. This system can be implemented in Industries, Hotels and wherever the LPG cylinders are used.

1) Fast Speed of response.

2) Immune to catalytic poisons.

3) High Reliability & Repeatability.

4) Heated optics eliminates condensation.

5) Ability to operate in the absence of oxygen or in enriched oxygen As detectors measure a specified gas concentration, the sensor response serves as the reference point or scale. When the sensors response surpasses a certain pre-set level, an alarm will activate to warn the user. There are various types of detectors available and the majority serves the same function: to monitor and warn of a dangerous gas level. However, when considering what type of detector to install, it is helpful to consider the different sensor technologies. Gas Detector Technologies :- Gas detectors are categorized by the type of gas they detect: combustible or toxic. Within this broad categorization, they are further defined by the technology they use: catalytic and infrared sensors detect combustible gases and electrochemical and metal oxide semiconductor technologies generally detect toxic gases.

Measurement of Combustible Gases :-

Catalytic sensors represent a large number of gas detector devices that are manufactured today. This technology is used to detect combustible gases such as hydrocarbon, and works via catalytic oxidation. The sensors of this type of detector are typically constructed from a platinum treated wire coil. As a combustible gas comes into contact with the catalytic surface, it is oxidized and the wiring resistance is changed by heat that is released. A bridge circuit is typically used to indicate the resistance change.

Infrared sensors or IR detectors work via a system of transmitters and receivers to detect combustible gases, specifically hydrocarbon vapors. Typically, the transmitters are light sources and receivers are light detectors. If a gas is present in the optical path, it will interfere with the power of the light transmission between the transmitter and receiver. The altered state of light determines if and what type of gas is present.

Common Gas Detector Applications

Although detectors are an essential application for home and commercial safety, they are also employed in numerous industrial industries. Gas detectors are used in welding shops to detect combustibles and toxics and in nuclear plants, to detect combustibles. They are also commonly used to detect hazardous vapours in wastewater treatment plants.

Gas detectors are very efficient in confined spaces where there is no continuous employee occupancy. Such spaces include tanks, pits, vessels and storage bins. Detectors may also be placed at a site to detect toxins prior to occupant entry. The chemical industry is a major player in the global economy. Leak Detection: Leaks are an ever-present hazard even in the best run chemical plants. Depending on the severity of the leak and the gas involved, the effects can potentially be very serious both within and without the perimeter of the plant. An explosion or fire will damage plant and put workers at risk, while toxic gases can spread rapidly, also putting the public at risk. Even a minor small leak has an economic impact on the plant's profitability as material is being wasted and the fault has to be rectified. To monitor for leaks, fixed gas detectors are integrated into the plant at key weak points such as valves, joints and pumps. The sensors used will obviously depend on the nature of the gas to be detected. For flammable gases, pellistors are widely used. This sensor works by burning the target gas; the heat generated producing a change in the resistance of the

detecting element of the sensor proportional to the gas concentration. To detect hydrocarbons, NDIR sensors are widely used. Ultrasonic gas leak detectors measure the ultrasonic sound level, typically between 25 kHz to 10 MHz frequencies. Ultrasonic gas detectors are mainly used for outdoor environments where weather conditions can easily dissipate escaping gas before allowing it to reach gas leak detectors that require contact with the gas in order to detect it. These detectors are most useful in facilities with a lot of outdoor pipeline.

13 APPENDIX:

Fire detection using temperature and gas sensors. Harmful or toxic gas leakages can identified . By the use of wireless technology, (5) information from these sensors can be broadcasted to the particular individual. Alert message are sent via an application and buzzer sound is enabled. The uniqueness of our application we will get live updates of temperature, humidity and radiation in and around the workers environment using IoT. This application has a powerful impact not only on the people but also on the environment.by using this application ,(2)individuals are alerted incase of danger or threat. there by environment as well as thousands of life can be saved which causes contentment.

SOURCE CODE:

```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random
#Provide your IBM Watson Device Credentials
organization = "97mai0"
deviceType = "Sivamadhavan23"
deviceId = "Sivamadhavanece"
authMethod = "token"
authToken = "I)&NoyRn-DUOO(*4yn"
try:
deviceOptions = {"org": organization,"type": deviceType,"id": deviceId,
```

```
"auth-method":
authMethod,"auth-token": authToken}
deviceCli = ibmiotf.device.Client(deviceOptions)
#.....
except Exception as e:
print("Caught exception connecting device: %s" % str(e))
sys.exit()
# Connect and send a datapoint "hello" with value "world" into the cloud as an
event of
type "greeting" 10 times
deviceCli.connect()
while True:
#Get Sensor Data from DHT22
Temperature=random.randint(0,100)
Humidity=random.randint(0,100)
Gas=random.randint(0,100)
data = { 'Temperature' : Temperature,'Humidity': Humidity,'Gas': Gas}
# print data
def myOnPublishCallback():
print ("Published Temperature = %s C" % Temperature,"Humidity = %s %%" %
Humidity,"Gas=%s %%" % Gas,"to IBM Watson")
success = deviceCli.publishEvent("IoTSensor","json", data, qos=0,
on_publish=myOnPublishCallback)
if not success:
print("Not connected to IoTF")
time.sleep(10)
```

GITHUB LINK: https://github.com/IBM-EPBL/IBM-Project-11240-1659282698

PROJECT DEMONSTRATION LINK:https://youtu.be/LdhUV_7CQGc