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IOT BASED SMART INDUSTRY MONITORING AND ALERTING SYSTEM

A PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this project report "IOT Based Smart Industry Monitoring and Alerting System" is the bonafide work of Ramya Ramakrishnan (RA1711003040001), K. Saivarun (RA1711003040117) and M.Kishore (RA1711003040141) who carried out the project work under my supervision.

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TABLE OF CONTENTS

ABSTRACT

With the advanced computer innovation and automation, the industries across the world have undergone a major revolution. This led to the elevated requirements of the commoner and contributed to the country's financial growth. IoT has converted itself to healthy diverse fields, particularly domestic automation, clever devices, and drastically contributing to the healthcare sector. IoT, paves a best solution for reduction of capital over 1/10th of the conventional systems. IoT also effectively increases productiveness of any industry, thus contributing to its development. Unlike Traditional Systems, we have used IoT technology to make a Smart Industry Monitoring and Alerting System and perform data analytics on sensor readings using cloud service successively. This will detect any leakage of harmful gases, and thus reports the details of the leakage effectively. This model's vision is to develop a system that automatically senses and alerts the corresponding officials, thus stopping gas leakages in those permeable areas. Throughout this module, our prototype's technological advantages – "IoT Based Smart Industry Monitoring and Alerting System" are being explored.

LIST OF FIGURES

CHAPTER - I

INTRODUCTION

1.1 Overview

The idea of Industrial IoT received high response with the advent of automation. IoT has end up the maximum preferred region of studies because it targets to boom productiveness and performance. The quantity of automobiles and industrial machines has elevated to peak fold in these twenty years. This adversely resulted in the surroundings through the boom in air pollution water pollution respectively, which led to a dangerous effect on people's healthful lives. This has elevated the dwelling requirements of the commoner and contributed to the country's monetary growth. IoT has converted itself to healthy numerous fields, particularly domestic automation, sensible buildings, clever cities, and appreciably contributing to fitness tracking. The advanced prototype can document the readings, which may be analysed. Potential factors may be identified, and corresponding sensors may be hooked up to screen and document the records. IoT targets at growing the productiveness and performance of any industry, however environmental duty ought to be the top element of concern. The large records may be despatched to Google Cloud, which allows tracking through legal employees across the globe. Hence, we initiate moves and actions to prevent these problems through properly designed alerting systems.

1.2 Objective

The proposed project objectives at analysing the form of industry, reading the character of techniques worried and figuring out the opportunity of fuel line leakage Potential factors may be diagnosed and corresponding sensors may be set up which could display and document the statistics. The massive statistics may be sending to Google Cloud which allows tracking through legal employees across the globe. Hence, we initiate moves and actions to prevent these problems through properly designed alerting systems. This will detect any leakage of harmful gases, and thus reports the details of the leakage effectively. This model's vision is to develop a system that automatically senses and alerts the corresponding officials, thus stopping gas leakages in those permeable areas.

CHAPTER – II

SYSTEM ANALYSIS

2.1 Problem Statement

The thought of Mechanical IoT (IoT) gotten sufficient publicity with the approach of robotization. IoT has conclusion up the most extreme sought-after area of considers since its objectives at boom in productiveness and effectiveness. This in flip unfavourably influenced the environment through boom in discuss and water poisons which finished in loathsome impact in wholesome ways of life of individuals. As in step with the environment reports, since off to begin with rate boom in masses and businesses boom of natural poisons has quickened day through day.

2.2 Problem Analysis

In this Project, we can sense that degree of pollutants has accelerated with instances with the aid of using lot of suppose much like the growth in populace, accelerated automobile use, industrialization and urbanization which ends up in dangerous results on human wellbeing with the aid of using immediately shifting fitness of populace uncovered there to it. To conquer this issue, we generally tend to introduce a machine via that the quantity of sound and consequently the lifestyles of the dangerous gases in the environment may be detected.

2.3 Existing System

In this existing demonstrate framework, Sensors are utilizing to checking contamination level additionally upgrade to server room. Observing the gas elude level from any a portion of the world will be accomplished by integration of gigantic data to the Google Cloud by means of net servers. A case backed Raspberry Pi was created that might sense the concentration of gasses. The information gotten from the different sensors has been transferred to Google cloud.

2.4 Proposed System

A prototype of IoT Based Smart Industry Monitoring and Alerting System to monitor, locate and successively alert gas leaks of a complex factory thus, controlling the pollution. The proposed model - has two server sections one is factory server and another one is TNPCB server. Sensors are used to monitor the pollution level and update to both factory and also TNPCB Server respectively. Potential factors may be recognized, and corresponding sensors may be established that could display and document the facts. The acquired facts are being despatched to Cloud which enables tracking through legal employees in TNPCB. Initiating preventive movements through alarms in case of any abnormalities determined withinside the acquired facts. Thus, by regulating their actions successively.

CHAPTER – III

LITERATURE SURVEY

3.1 Identifying Weather and Monitoring Systems

Title: AN IOT BASED SMART INDUSTRY MONITORING SYSTEM BY USING RASPBERRY PI
Author Name: Venkata Subbiah , Venkata Sreekanth Reddy.
Year Of Publish : 2018

In trade atmospheric condition Places a significant Role, If there's any Changes in Weather of the Machines or instrumentality Causes Major Damages to the trade and effects Economy of the trade to guard from this sort of Damages are introduce IOT primarily based good trade Weather observation System mistreatment Raspberry pi three it's the Advanced Technology wherever we are able to Monitor Weather within the trade from anywhere in the World by mistreatment IOT Technology this method Collects the Weather Parameters from Sensors and Updated in thingspeak.com using hypertext transfer protocol.

3.2 Vehicular Pollution Monitoring Systems

Title: Development of IoT based Vehicular Pollution Monitoring System
Author Name: Ramagiri Rushikesh, Chandra Mohan Reddy Sivappagari
Year Of Publish : 2016

Remote sensors are utilized in the Air and Sound Pollution Monitoring tool may be accessed via way of means of the government and the not unusual place humans belonging to the region. The tool may be hooked up via a cellular software with the intention to display the stay updates of the pollutants stage of the region. This tool is likewise able to detecting the hearthplace in its region and notify the equal to the hearthplace brigade government in order that they might take essential movements accordingly, and additionally the cellular programs may be hooked up withinside the hearthplace brigades itself in order that if a hearthplace is taking vicinity nearby, it can be managed in time to lessen lack of humans and property. The embedded sensors withinside the gadget assist to stumble on main air polluting gases including CO2, SO2 and CO and stage of sound pollutants. The idea of IOT allows to get entry to records from far flung places and store it in database in order that we don't want to genuinely be found in that region.

3.3 Gas Leaks in Indoor Environment Systems

Title: Gas Leak Detection and Localization System Through Wireless Sensor Networks
Author Name: Petros Spathose , Liang Song
Year Of Publish : 2014

In this exhibit motivation we utilize a model of a#Wireless Sensor Arrange (WSN) to uncover and discover fueloline spills of a complicated indoor environment. Particularly, a cellular hub is moving inward a building to uncover any spillage of carbon dioxide (CO2), making a difference and appearing the degree and the put of the spillage. All through the exhibit, the mechanical benefits of cognitive organizing at the side multihop directing are investigated.

3.4 Sensor Based Alerting Systems

Title: GAS LEAKS BASED DETECTION ALERTING SYSTEM
Author Name: Shital Imad, Priyanka Rajmanes
Year Of Publish : 2018

Internet of Things purpose closer to making lifestyles less complicated with the aid of using automating each small assignment round us. As a great deal is IoT supporting in automating tasks, the advantages of IoT also can be prolonged for boosting the present protection standards. Safety the fundamental challenge of any project, has now no longer been left untouched with the aid of using IoT. Gas Leakages in open or closed regions can show to be risky and lethal. The conventional Gas Leakage Detector Systems aleven though have first-rate precision, fail to well-known some elements withinside the subject of alerting the humans approximately the leakage.

3.5 Air and Sound level Monitoring Systems

Title: IOT Monitoring Pollution System Using Air and Sound
Author Name: Anushka Sharma, Vaishnavi Varshney,
Year Of Publish : 2018

The developing air and sound pollutants is one of the critical problems those days. This big quantity of growing pollutants has made human lifestyles at risk of big quantity of diseases. Therefore, it has now come to be essential to manipulate the pollutants to make certain healthful livelihood and higher future. The Air and Sound Pollution Monitoring tool may be accessed via way of means of the government and the not unusual place humans belonging to the region. The tool may be hooked up via a cellular software with the intention to display the stay updates of the pollutants stage of the region. This tool is likewise

able to detecting the hearthplace in its region and notify the equal to the hearthplace brigade government in order that they might take essential movements accordingly, and additionally the cellular programs may be hooked up withinside the hearthplace brigades itself in order that if a hearthplace is taking vicinity nearby, it can be managed in time to lessen lack of humans and property. This gadget works at the techniques of IOT that is a growing generation primarily based totally at the fusion of electronics and laptop science. The embedded sensors withinside the gadget assist to stumble on main air polluting gases including CO2, SO2 and CO and stage of sound pollutants. The idea of IOT allows to get entry to records from far flung places and store it in database in order that we don't want to genuinely be found in that region.

3.6 Air Quality Pollution Monitoring Systems

Title: IOT Forecasting System Using ESP8266

Author Name: Vishakha Dhoble, Nikita Mankar,

Year Of Publish : 2018

Any interest regarding burning things/fuels and combining materials that motive chemical reactions may also launch poisonous gases withinside the technique and a few sports like construction, mining, transportation, etc. produce big quantities of dirt which has the ability to motive air pollutants. As technology of poisonous gases from industries, automobiles and different reassets is highly growing day with the aid of using day, it turns into tough to govern the dangerous gases from polluting the natural air. Air pollutants now no longer best brings extreme harm to human fitness however additionally reasons terrible outcomes to herbal environments. The air pollutants takes place because of infection of air with Carbon monoxide (CO), Carbon dioxide (CO2), Nitrogen dioxide (NO2), Sulphur dioxide (SO2) and lots of different dangerous pollutants. This pollutant reasons extreme harm to environment. It additionally has dangerous outcomes on human fitness. Carbon monoxide reduces oxygen wearing potential of the bodys organs and tissues which may also result in cardiovascular disease. Carbon monoxide reasons visible impairment, decreased guide dexterity, decreased paintings potential, bad gaining knowledge of ability. So it turns into increasingly crucial to display and manipulate air pollutants. It becomes clean to govern it with the aid of using tracking the awareness air pollutant parameters in air. Using laboratory analysis, traditional air computerized tracking machine has distinctly complicated system technology, big bulk, volatile operation and excessive cost.

3.7 Environment Quality Monitoring Systems

Title: IoT Air Texture Monitoring

Author Name: N Setiawan , Kustiawan

Year Of Publish : 2017

Air pollutants is a aggregate of stable debris and gases withinside the air. Car emissions, chemical substances from factories, dust, pollen and mould spores can be suspended as debris. Effect of air pollutants has many horrific matters and the others might also additionally also motive issues to our health, for instance, asthma, cough, and lung disorders. In addition, the pollutant can motive worldwide warning, acid rain, and annoying plant growth. Basically, a human can not decide whether or not or not the air is ideal or not. Hence, its miles vital to have a device which could degree the air first-class. This studies is purposed to layout an air first-class tracking machine with the useful resource of using using esp8266 module. As the result, customers can display the air first-class the use of phone related thru ESP8266 Wi-Fi. Therefore the air situation might also additionally be monitored each time. Currently, there might also additionally be a lot air pollutants instances that certainly might also additionally be modified if were aware. In different phrases we will make a contribution as a element of the answer as a substitute a element of the pollutants.

3.8 LPG Gas Leakage Detector System

Title: Microcontroller Based Low Cost Gas Leakage Detector with SMS Alert

Year Of Publish : 2019

Author Name: Mr. Arijit Banik Mr. Bodhayan Aich

The Air and Sound Pollution Monitoring tool may be accessed via way of means of the government and the not unusual place humans belonging to the region. The tool may be hooked up via a cellular software with the intention to display the stay updates of the pollutants stage of the region. This tool is likewise able to detecting the hearthplace in its region and notify the equal to the hearthplace brigade government in order that they might take essential movements accordingly, and additionally the cellular programs may be hooked up withinside the hearthplace brigades itself in order that if a hearthplace is taking vicinity nearby, it can be managed in time to lessen lack of humans and property.

CHAPTER – IV

SYSTEM REQUIREMENT SPECIFICATION

4.1 Hardware Requirements

- NODEMCU
- Arduino Uno Device
- LCD 16*2
- GAS Sensors – MQ 6 and MQ 7
- Temperature and Humidity Sensor - DH11
- Relay
- Buzzer
- Power unit

4.2 Software Requirements

- Language Programmed: C++, Java
- Compiler Used : Arduino Uno IDE
- Other Softwares Used : Android Studio, VS Code

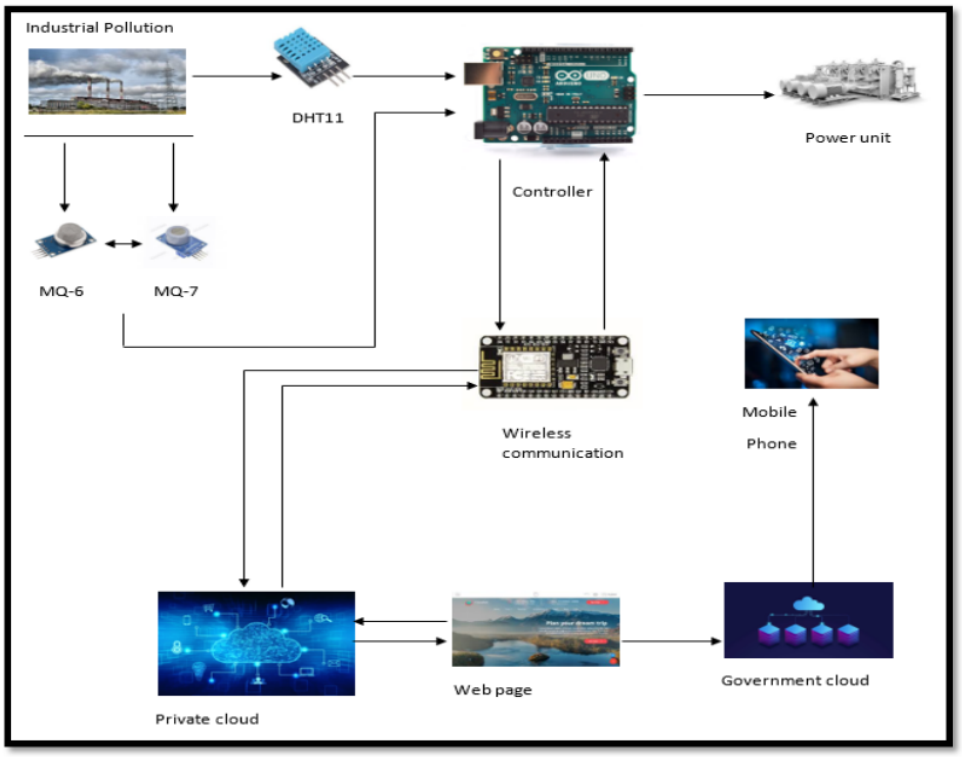
CHAPTER – V

SYSTEM DESIGN SPECIFICATION

5.1 System Architecture

The block diagram given below contains NODEMCU Unit, Arduino UNO, gas sensors, temperature and humidity sensor, power units, and a DC Motor. Sensors are connected to GPIO Pin of Arduino UNO. NODEMCU connected to UART Port of Arduino UNO, which collects the sensor values from Arduino UNO and sends them to the cloud. The Sensor Values are updated to two server rooms (Factory Server and TNPCB Government Server) and are constantly stored in cloud database using Firebase. If Processor receives abnormal values, a notification will be released in form of buzzer. TNPCB will send the warning message to respective factory official in their respective application developed for mobile. The obtained data is being sent to the cloud which helps tracking with the aid of using legal employees in TNPCB. Initiating preventive movements with the aid of using relay in case of any abnormalities determined withinside the acquired data. Thus, by regulating their actions successively.

Fig. 5.1 – System Architecture Diagram



5.2 Modules

Technical Modules involved in the Project

Prototype - IoT Based Smart Industry Monitoring and Alerting System

Module – 1

Implementing Sensor Integration and Calibration

Module – 2

Integration of Data between both servers (Private Cloud and Government) with sensors

Module – 3

Real Time Data Interpretation and Live Action of Power Outage Relay

5.3 Modules Description

1. Implementing Sensor Integration and Calibration

- In this system, NODEMCU serves as a median internet connector for information accessing through cloud interface. The sensors are calibrated successively and attached to the GPIO Pins of Arduino UNO.
- All Sensors are successively wired to PCB board and are connected directly component's window as explained in the architecture illustration.
- Then we integrate and calibrate the three sensors that detect gases and temperature and humidity respectively with Arduino UNO before the information is detected and passed to the controller module.

2. Integration of Data between both servers (Private Cloud and Government) with sensors

- In this system, we integrate the data between both the servers i.e Public and Private Cloud through google firebase respectively with Arduino UNO before the information is detected and passed to the controller module.
- Both the clouds are synced successively and are connected directly in real-time.

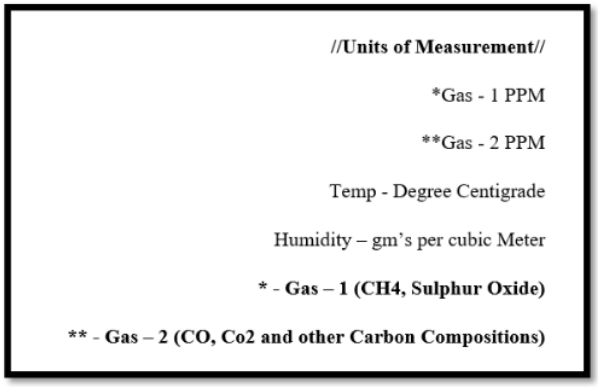
3. Real Time Data Interpretation and Live Action of Power Outage Relay

Processor getting abnormal values from sensors it will activate buzzer sound reflected from both Government's and Organization's cloud server.

The two-step process happening at this juncture are:

- TNPCB would send one warning message to factory's authoritative pollution level manager.
- In case the company doesn't make any pollution controlling process, the power supply of the Factory unit is disrupted and the license will be cancelled by TNPCB.

Fig. 5.2 – Units of Measurement for various parameters



CHAPTER – VI

SYSTEM IMPLEMENTATION

6.1 Sensor Integration and Arrangement

In the prevailing scenario, monitoring of emissions consisting of gases produced withinside the ecosystem could be very important. Right from home domestic equipment's consisting of air conditioners to electric powered chimneys, it is essential to monitor the gases. Gas sensors (MQ-6 and MQ-7) are critical a part of this system.

DHT11 – provision's a temperature & humidity sensing detail with a digitally - calibrated sign output. With the assist of this unique acquisition approach and temperature-humidity sensing technology, thereby guarantees good reliableness.

6.2 Reading Values calibration using Arduino uno

Sensors are a key aspect of the fault detection machine due to the fact they offer all of the statistics the machine will ought to deal with, even though in a few instances statistics coming from manufacturing control structures may be useful.

6.3 Factory and TNPCB Cloud Architecture

The base of operations Realtime info may be a cloud-primarily primarily based totally database that allows to save and synchronize in real-time. base of operations gives backend services, easy-to-use SDKs, and ready-made UI libraries to evidence customers to the app.

Base of operations Cloud Service gives a dependable hyperlink among the server and gadgets that lets in to supply and get hold of messages and notifications on iOS, Android, and also the internet in turn at equal time. This statistic data is connected to the TNPCB Server at real-time.

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6.4 Webpage and Mobile Application Development

Website is designed using PHP. The Mainframe of the pages is architected using HTML, CSS, SaSS and JS.

It consists of three webpages:

1.Home page

2.Login page

3.Registration page.

Every factory registers an account for its organisation. Once logged in, there would be a page for smart-meter which would showcase the value of gas, temperature, humidity and the status (whether it is a within or exceeding the permissible limit).

Mobile application is completely handled by the Organisation and used to have a check on the gas, temperature and humidity and to keep a check on its status. It is coded using java. There are two pages designed for login/registration and the other, once logged in shows the pollution status of the factory.

6.5 Warning Message Generation and Live Action Relay

The Webpage has two options under warning actions :-

1. Sending the Email if the pollution level had exceeded

2. Switching off the power if the pollution level has still not been controlled even on receiving the e-mail and switching it on again after prior action taken by TNPCB, both ON and OFF button in the smart meter webpage are connected to the firebase. Firebase sends the corresponding Radio wave frequency to transmit the data to NODEMCU, which in-turn activates the relay to cause power outage at the factory end.

Fig. 6.1 – Working Flow Diagram of Module

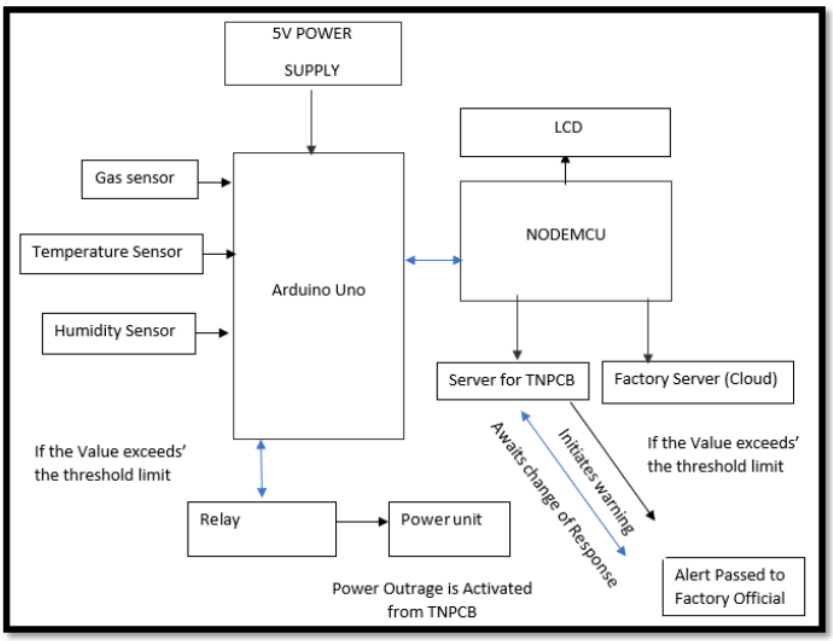
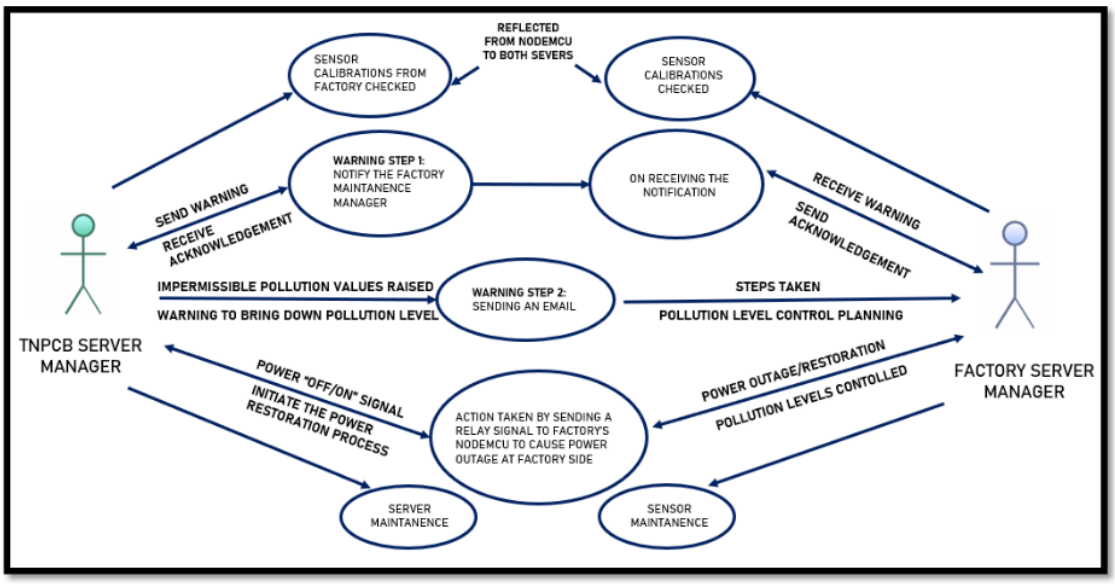


Fig. 6.2 – UML Diagram of Module



CHAPTER – VII

RESULTS AND DISCUSSIONS

Outcome of the Proposed System

- Potential points are identified to monitor and identify the changes in real-time
- Detects Temperature, humidity, level of leaked harmful gases from industrial premises successfully.
- Both the Clouds are synced successively and are connected directly in real-time which are used to monitor, locate and successively alert gas leaks of a complex factory thus, controlling the pollution.

Challenges Addressed

- Need an internet connection to access from anywhere in the world without cannot access | Wifi has limited range Speed of the most wireless network
- Range affected by varies medium and slower than the cable.
- Comparisons of particulate measurements are also problematic to measure
- Range of reference-equivalent methods available and the limitations, in many ways, of the reference method itself.

Results Obtained

- The Prototype of Module – "IoT Based Smart Industry Monitoring and Alerting System" is successfully designed
- Both the Clouds are synced successively and are connected directly in real-time which are used to monitor, locate and successively alert gas leaks of a complex factory thus, controlling the pollution.
- The Sensor Values are updated to two server rooms (Factory Server and TNPCB Government Server) and are constantly stored in cloud database using Firebase.
- The obtained data is being sent via Cloud that facilitates observation via approved personnel in TNPCB. Initiating preventive movements through the obtained data. Thus, by regulating their actions successively.

CHAPTER – VIII

SCREENSHOTS

Fig. 8.1 – Description of Various Sensors and other components in the prototype

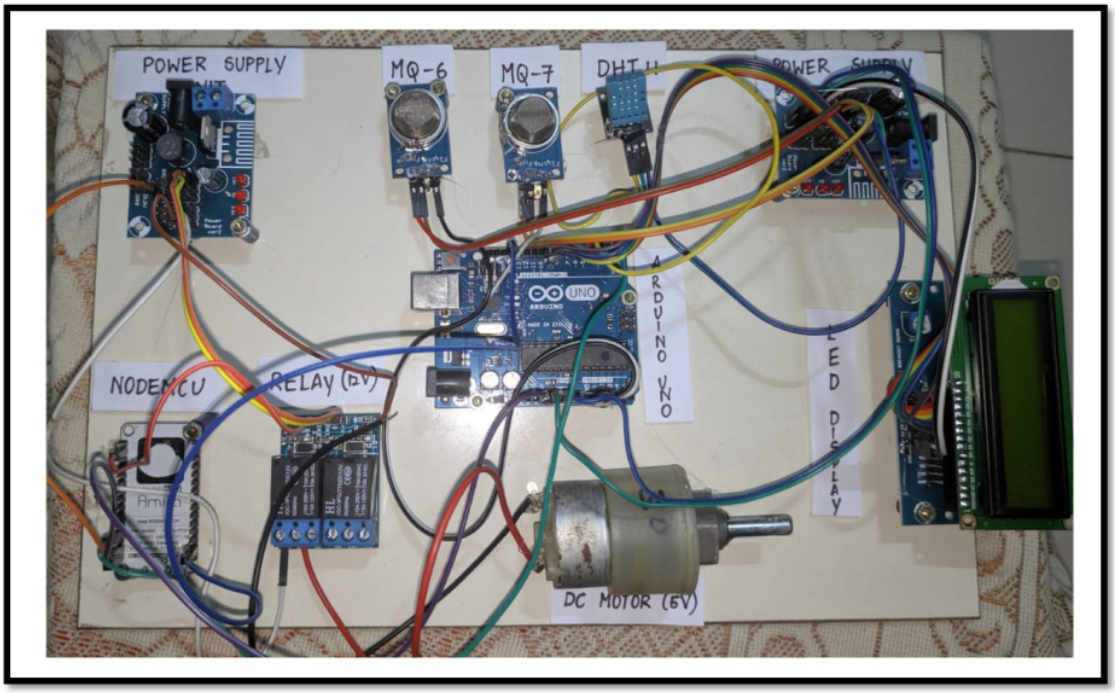


Fig. 8.2 – Readings Observed in the Prototype

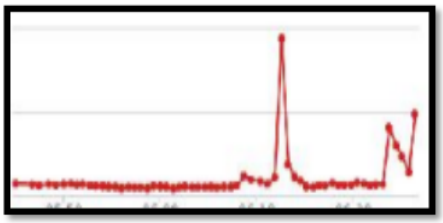


Fig. 8.3 – Module When Completely Powered ON

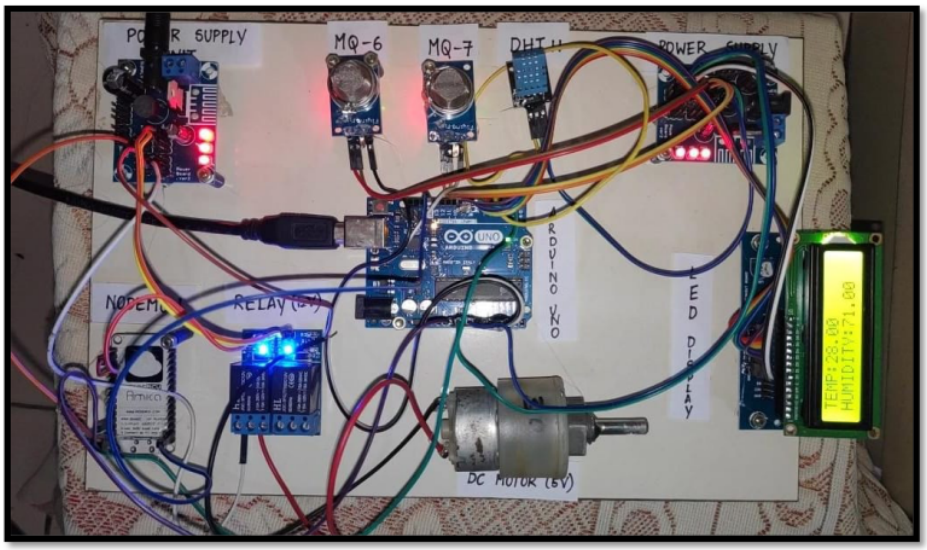


Fig. 8.4 –Webpage Created for the Government End

www.iotclouds.in/monitoringSrm

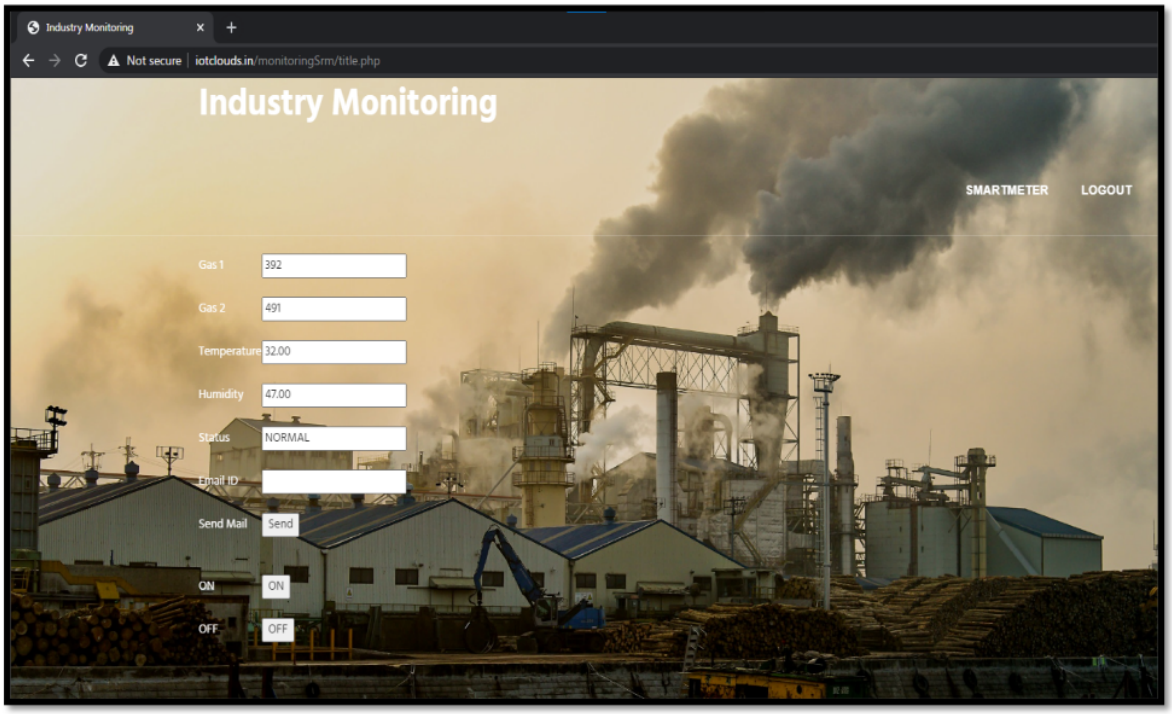


Fig. 8.5 – APK Working Screenshot and Readings

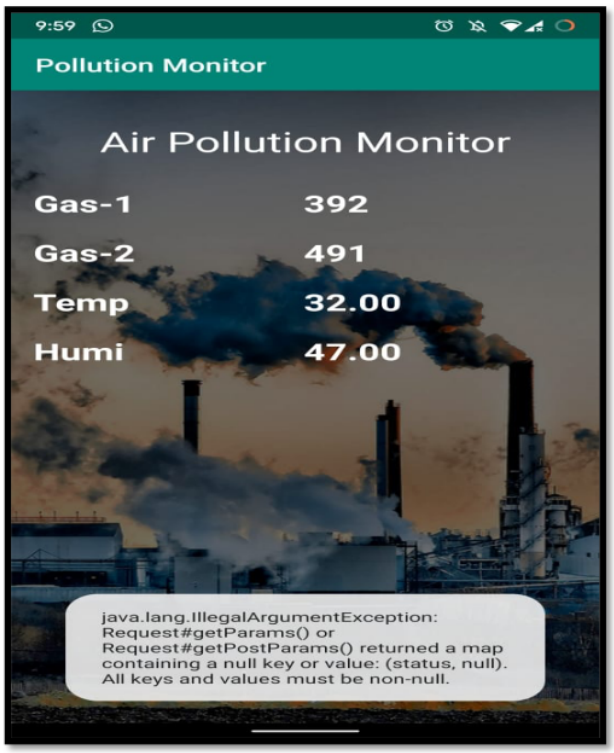
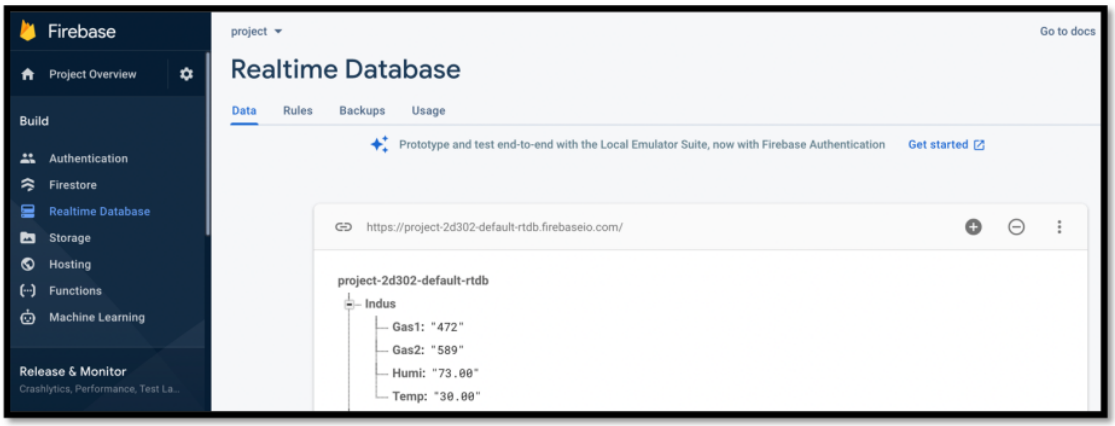
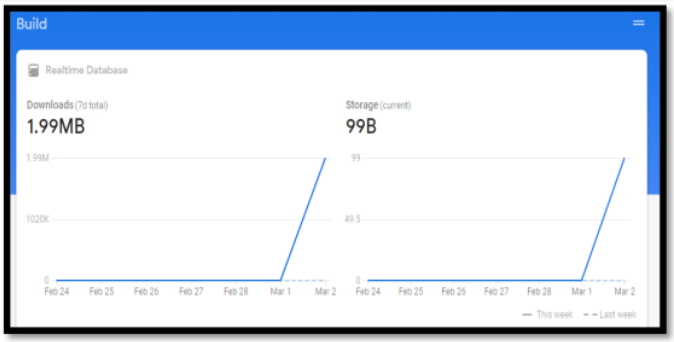


Fig. 8.6 - Firebase Realtime Database





CHAPTER – IX

CONCLUSION AND FUTURE WORK

Conclusion:

This model system supported measure method is consistent and are recorded time to time creating easy analysis and on top of data obtained are plotted. Provisions were additionally created to alert the employees just in case of any emergency. This model has made-up method for easy observance the pollutants even though the worker is in a very completely different location victimisation mobile application. This model thereby not just improves the working of an industry but saves life and the eco system too. Technological development must widen and reach a peak along with proper precautions taken against environmental pollution.

Future Work:

This prototype of IOT Based Smart Industry Monitoring System is a good step towards a healthy livelihood. With the assistance of this device not solely the industries will monitor the number of pollutions however even the govt can participate within the method of dominant pollution and guarantee safe surroundings. This automatic model, once put in is capable of endlessly following the pollution level and analyses the detected information. the foremost highlight feature of this device is that the output is described in time period and accessible on good phones and even from the webpage. The device itself is extremely eco-friendly and doesn't hurt the environment in any way. Moreover, it is based on one in every of the trendy technologies and conjointly cheap as compared to different technologies developed to this {point} and might be put in efficiently. prognostic maintenance is a futuristic industrial need, that the planned model is often improvised.

CHAPTER – X

SOURCE CODES OF THE PROTOTYPE

Arduino Sensor and Pin Functioning Code

```
#include <SoftwareSerial.h>

#include <LiquidCrystal.h>

//SoftwareSerial mySerial(10, 11);

#include <dht11.h>

#define DHT11PIN 4

int PWM = 3;            //Digital pin D3 por PWM signal

int pwm = 0;

dht11 DHT11;

int G=A1;

int G1=A2;

float H,T;

String D;

const int rs = 9, en = 8, d4 = 7, d5 = 6, d6 = 5, d7 = 3;

LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

void setup() {

Serial.begin(9600);

//mySerial.begin(9600);

pinMode(G,INPUT);

pinMode(G1,INPUT);

 lcd.begin(16,2);

 lcd.setCursor(0,0);
```

```
 lcd.print("Industry monitoring");
 lcd.setCursor(0,1);
 lcd.print("    Sytem");
 delay(1000);
}
void loop() {
  //delay(1000);
  int chk = DHT11.read(DHT11PIN);
  H=((float)DHT11.humidity);
  T=((float)DHT11.temperature);
  int GAS=analogRead(G);
  int GAS1=analogRead(G1);
  if(GAS>900 && GAS1>900)
  {
  D="EMERGENCY";
  }
  else if(GAS<900 && GAS1<900)
  {
  D="NORMAL";
  }
lcd. clear ();
  lcd. set Cursor(0, 0);
  lcd. print ("GAS1:");
  lcd. print (GAS);
  lcd. Set Cursor (0, 1);
  lcd . print ("GAS2;");
```

```
  lcd . print(GAS1);
  delay(500);
  lcd . clear();
  lcd . set Cursor (0, 0);
  lcd . print("TEMP:");
  lcd . print(T);
  lcd . set Cursor(0, 1);
  lcd . print("HUMIDITY:");
  lcd . print(H);
  delay(500);
  Serial.println("@"+String(H)+"#"+String(T)+"$"+String(GAS)+"%"+String(GAS1)+"^"+D+"&");
  delay(9000);
}
```

NODEMCU Connection Establishment– Cloud Side Firebase Linking Code

```
#include "FirebaseESP8266.h"

#define FIREBASE_HOST "project-2d302-default-rtdb.firebaseio.com"

#define FIREBASE_AUTH "l7JKN1pLueHMmf74eE9znD6UMdyBFSZ0bvrca7L6"

#define WIFI_SSID "iotkit"

#define WIFI_PASSWORD "123456789"

#define relay1 5

//#define relay2 9


#include <SoftwareSerial.h>

//SoftwareSerial mySerial(5, 4);//(RX,TX)

String path0="/Indus";

String path3 = "/Switch";

String S,S1,S4,S5,S6,S7,S8;

char *S2;

char *S3[5];

int i=0;

FirebaseData firebaseData;

void setup()

{

 pinMode(relay1,OUTPUT);

 //pinMode(relay2,OUTPUT);

 digitalWrite(relay1,HIGH);

 //digitalWrite(relay2,LOW);

Serial . begin (9600);

WiFi . begin (WIFI _ SSID, WIFI _ PASSWORD);
```

```
  while  (WiFi . status () ! = WL _ CONNECTED)
  {
   Serial . print (".");
   Delay (300);
  }
  Serial . println();
  Serial . print("Connected with IP: ");
  Serial . println (Wi Fi . local IP ());
  Serial.println();
  Firebase . begin (FIREBASE _ HOST , FIREBASE _ AUTH );
  Firebase . reconnectWiFi(true);
  {
   Serial . println("connected");
  }

}
void loop() {
  Firebase . getString(firebaseData,path3);
String r=(firebaseData.stringData());
 Serial.println(r);
if(r=="OFF")
{
  //digitalWrite(relay2,LOW);
  digitalWrite(relay1,LOW);
}
else if(r=="ON")
```

```
{
 //digitalWrite(relay2,HIGH);
 digitalWrite(relay1,HIGH);
}
  if(Serial.available())
  {
   S=Serial.readString();
   int e=S.indexOf("@");
   int e1=S.indexOf("#");
   int e2=S.indexOf("$");
   int e3=S.indexOf("%");
   int e4=S.indexOf("^");
   int e5=S.indexOf("&");
    S4=S.substring(e+1,e1);
    S5=S.substring(e1+1,e2);
    S6=S.substring(e2+1,e3);
    S7=S.substring(e3+1,e4);
    S8=S.substring(e4+1,e5);
    Serial.println(S4);
    Serial.println(S5);
    Serial.println(S6);
    Serial.println(S7);
    Serial.println(S8);

//String json="{\"HUMIDITY\":" + S4 + ",\"TEMPERATURE\":" + S5 + ",\"GAS1\":" + S6 +
",\"GAS2\":" + S7 + ",\"STATUS\":" + S8 + "}";
```

```
String json="{\"Humi\":" + S4 + ",\"Temp\":" + S5 + ",\"Gas1\":" + S6 + ",\"Gas2\":" + S7 + "}";
//Firebase.setJSON(firebaseData,path0,json);
Firebase.setString(firebaseData,path0+"/Humi",S4);
Firebase.setString(firebaseData,"/Status",S8);
 Firebase.setString(firebaseData,path0+"/Temp",S5);
 Firebase.setString(firebaseData,path0+"/Gas1",S6);
 Firebase.setString(firebaseData,path0+"/Gas2",S7);
 //Firebase.setString(firebaseData,"/LONGITUDE",S3);
/*Firebase.setString(firebaseData,"/Forest Fire Detection/GAS1",S6);
Firebase.setString(firebaseData,"/Forest Fire Detection/GAS2",S7);*/
Serial.println(json);
Serial.println(S8);
//Firebase.setString(firebaseData,"/Forest Fire Detection/STATUS",S8);
 }
}
```

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