“IOT BASED AIR & SOUND POLLUTION MONITORING SYSTEM USING RASPBERRY PI.”

A SEMINAR REPORT

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

Submitted to

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

Submitted By

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Wagholi Pune – 412207

CERTIFICATE

This is to certify that the Project entitled " IOT Based Air & Sound Pollution Monitoring System Using Raspberry Pi" submitted by Chandrashekhar, Tukaram, And Abhishek is a record of the bonafide work carried out by him / her, under my guidance, and it is approved for the partial fulfillment of requirement of Savitribai Phule Pune University for the award of the degree **Bachelor of Engineering (E&TC Engineering).**

Prof. A. A. Trikolikar	**Dr. S. K. Bhatia**	**Dr. R.S. Deshpande**
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Place: Pune

Date:

ACKNOWLEDGEMENT

It's our great pleasure to present a seminar report entitled **"IOT Based Air & Sound Pollution Monitoring System Using Raspberry Pi ".** This report is an outcome of various efforts by us in collating and identifying the sources of information and knowledge. We use this occasion to thank my guide with whose guidance this effort would not have borne fruits. We find no words to express our gratitude to **Prof. A. Trikolikar** who not only advised and guided us during the report writing but also answered all our queries concerning collection of data, proper structuring of the report, and its improvement. We are virtually indebted to the Head of the Department **Prof. S. K. Bhatia** from Imperial College of Engineering and Research who have bestowed all their blessings in the form of guidance which was the leading light to complete this seminar report. We are also thankful for our principal, **Dr. R. S. Deshpande** who provided us valuable support in completion of the seminar by providing us different facilities in college and by giving permission for working out of college.

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ABSTRACT

In today's world, the continuous rise in air and sound pollution has become a serious problem. Controlling and carefully monitoring the situation has become necessary in order to take the necessary steps to alleviate the situation. This research has proposed an IOT-based technique for monitoring the air quality index and noise intensity of a region. The Air Quality Index Monitoring Module, the Sound Intensity Detection Module, the Cloud-based Monitoring Module, and the Anomaly Notification Module are the four modules that makeup the recommended technology. To begin with, the air quality index is calculated based on the presence of five specific air contaminants. The sound intensity is then detected using the appropriate sensor. After that, the Cloud-based Monitoring Module ensures the data collection process with the support of the Raspberry Pi's Wi-Fi module, achieving the goal of data analysis on a regular basis.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND AND BASICS

These days, air and sound pollution are major problems. To preserve a healthy and safe environment, air and sound pollution levels must be monitored. Environmental Concerns have affected the demand for smart monitoring systems as infrastructure and industrial units have grown rapidly. The Internet of Things (IoT) is becoming increasingly popular due to its low cost, high efficiency, and versatility. The Internet of Things (IoT) allows gadgets and humans to interact.It serves as a conduit for human to machine communication. Data collectors used to have to travel considerable distances to various sites to collect data, which was then analysed. This Was a long and time consuming process. However, internet connected sensors and microcontroller scan now make environmental parameter monitoring more versatile, accurate, and time consuming. A smart environment is created when the environment is combined with sensors and technologies to self protect self monitor.

LITERATURE REVIEW

A research paper is a document of a scientific article that contains relevant expertise, including substantive observations, and also references to a specific subject of philosophy and technique

1. **Paper Name:** A Raspberry Pi Controlled Cloud Based Air and Sound Pollution Monitoring System with Temperature and Humidity Sensing

Author: Arnab Kumar Saha1 , Sachet Sircar2 , Priyanshu Chatterjee3 , Souvik Dutta4 , Anwesha Mitra4 , Aiswarya Chatterjee4 , Soummyo Priyo Chattopadhyay1
, Himadri Nath Saha1

Description : In recent day scenarios, the incessant increase in air and sound pollution prove to be an alarming problem. It has become mandatory to control and appropriately monitor the situation so that the required steps to curb the situation can be undertaken. In this project, an IOT-based method to monitor the Air Quality Index and the Noise Intensity of a region, have been proposed. The recommended technology comprises four modules namely, the Air Quality Index Monitoring Module, the Sound Intensity Detection Module, the Cloud-based Monitoring Module and the Anomaly Notification Module. Firstly, the Air Quality Index is measured consider- ing the presence of the five criteria air pollutants. Then the sound intensity is

detected using the respective sensor. After that, the Cloud-based Monitoring Module ensures the process of acquiring the data with the help of Wi-fi-module present in Raspberry Pi which fulfills the objective of analysis of information on a periodical basis. Finally, the Anomaly Notification Module alerts the user in case of an undesired condition. Keywords—Raspberry Pi 3B; MQ -135; LM 393; Air Quality Index;Sound Intensity.

2. Paper Name: Design and Implementation of Portable Sensory System for Air Pollution Monitoring

Author: Xuan Zhao, Siming Zuo, Rami Ghannam, Qammer H. Abbasi and Hadi Heidari Microelectronics Lab (meLAB), School of Engineering, University of Glas- gow, G12 8QQ, Uk

Abstract: Air pollution is becoming an increasingly serious issue, leading to many environmental problems such as the fog-haze weather phenomenon, which can cause great harm to human health. This paper focuses on the design and fabrication of a portable sensory system for air pollution monitoring, which can detect the tem- perature, humidity and particulate matter (PM). This will be used as a tool to help reduce the harm of air pollution on people. This sensor mainly consists of a micro programmed control unit, a temperature humidity sensor DHT11, a dust sensor GP2Y1010AU0F, LCD, keys and LEDs. Ambient dust concentrations, temperature and humidity values will be displayed on the LCD. The corresponding light alert signals and sound alert signals are sent when the measured values are beyond their safe ranges. Keywords— Air Quality; LCD Display; Temperature and Humidity Detection; Dust Detection

3. Paper Name: I2P Air Purifier with Air Quality Monitoring Device

Author: Manisha Sharma1 , Ajay Kumar2 , Abhishek Bachhar3 1, 2, 3 Department of Electronics and Communication Engineering, Hyderabad Institute of Technology and Management, Affiliated to JNTU, Hyderabad, Telangana, India.

Description: Air pollution is an addition of harmful substances in the atmosphere, which results in environmental damage. The industrial development and reduction in forests, which are two main root causes of air pollution, has increased the death rates of people dying from diseases like breathing problems and lung cancer. So, to fight against this serious threat to mankind, we decided to stand by this society and we made up our mind to do something to detect the amount of impurities in the air and considerably reduce the amount of impurities present in the air. In the project, we are detecting impurities using a gas sensor. Impure air is input to the gas sensor. The sen- sor is connected to the Arduino which consists of code which will help us in detecting the amount of impurities in the air. After taking the inputs regarding the amount of impurities from the doctor we have set a limit up to which extent impurities are not harmful. If the limit exceeds then a buzzer sounds along with the LCD display which gives us the information that it's time to switch ON the filtering device. After that filtering device gets turned ON and air gets purified. Coming to applications it can be used in the place where there is a need for oil mist collectors, dust collectors, UV air purifiers etc. Keywords- Arduino, Gas Sensor (MQ-2), Temperature Sensor (DHT11), LCD (16x2), Buzzer, Filtering device (consisting of several layers).

4. Paper Name: An Efficient Tracking System for Air and Sound Pollution using IoT.

Author: K. Cornelius1 , N. Komal Kumar , Sagar Pradhan , Priyesh Patel, N. Vinay Department of Computer Science and Engineering

Description: The growth of pollution is broadening day by day with certain factors that affect the environment and result in the loss of biological degradation. This could be due to rapid industrialization and urbanization. It is directly affecting the health of the people in one way or another and results in the degradation of the population. It is very important to examine the air quality as well as the sound level and put it under governance for a good future and wholesome living for all. The Major decline has been seen in infrastructure and industrial plants and their expeditions growth creating several environmental problems like pollution such as air, water, Noise, climatic changes, atmospherics differences, the glitch that has environment corollary for the requirement of an anatomically adjustable, effectual, affordable and smart monitoring system. Here we design an air quality as well as a sound contamination surveillance system that permits us to observe and check live air peculiarity as well as sound contamination in a specific area through the latest technology IoT. The level of air and sound contamination is growing all of a sudden. To make it under inspection and surveillance is highly preferred. To conquer this problem, we are establishing a structure through which the growing issue of sound and the pres- ence of dangerous gases in the environment can be identifie

5. Paper Name: Integrated Pollution Monitoring System for Smart City

Author: Baihaqi Siregar

Description: The continuous monitoring of pollution level in urban areas is impor- tant for a smart city. There are several parameter changes that indicate the pollution: dust particle density in the air, humidity, light intensity, and the level of sound noise. A technology that can be developed for an integrated pollution monitoring system is wireless sensor network (WSN) utilizing waspmote smart cities device, connected with several sensors, such as dust sensor PM-10 (GPY21010AU0F), humidity sensor (808H5V5), luminosity sensor (LDR), and microphone (dBA). As a communication protocol we used 3G connectivity to store the data to the cloud system. Prototype of this system had been tested in a controlled laboratory environment and the performance of the developed system was as expected. The Results of this system can be used by government and policy makers as basic information to take further actions reducing pollution level. Keywords: wireless sensor network, smart cities, waspmote, pollution, dust, luminosity, humidity, noise.

6. Paper Name: The Acoustic Theory To Measure The Volume Fraction Of Suspended Particulate Matter In The Air.

Author: Yong WANG, Shuyu LIN*

Description: Suspended particles are a general term for solid and the liquid particulate matter suspended in the atmosphere. Total suspended particles in air quality evaluation are an important general pollution index. This paper aims to find a simple acoustic method to measure the volume of the total suspended particles. In order to measure the volume fraction of suspended particulate matter in the air, we studied the effect of the volume fraction and the density of the suspended particulate matter on the speed of the sound wave in the air. We considered the suspended particulate matter to the vibration model of the air, and get the equivalent sound velocity by solving the equation of the mass conservation and the energy conservation of the air element when they are vibrating. We found that the sound speed of the mixture will be affected by the density and the volume fraction of the suspended particulate matter, it will decrease with increasing the particle density when one keeps the vol- ume fraction constant, and so does the volume fraction when one keeps the particle density constant. So we think that, in a certain range of error, the volume fraction of the suspended particulate matter can be determined by measuring the sound velocity in the mixture of the solid particles and air. Keywords: Acoustic measurement; Suspended particulate matter; Equivalent sound velocity; Volume fraction

7. Paper Name: The HMM Diagnostic Models of Respiratory Sounds Modelos de diagnóstico HMM para Sonidos del Pulmón

Author: P. Mayorga1

Description: Numerous studies including annual reports by Blacksmith Institute clearly document the magnitude of regional pollution and associated health risks. In particular the air pollution encompassing PM10 and smaller particles significantly contributes to the prevalence of respiratory diseases. Specifically, the city of Mexi- cali with a PM10 ranking of 137 in 2010 is considered as the most polluted city in Mexico largely due to the contribution of unusual environmental factors. Resulting respiratory abnormalities are often reflected in peculiar auscultatory indicators and their assessment can be accomplished using low cost technologies. These economic aspects are critical not only in Latin America but also other population centers glob- ally considering the limited level of health services. Any classification of ausculta- tory indicators as reflected in lung sound (LS) characteristics needs to account for a noisy environment and the influence of heart sounds (HS). The aim of these studies was to utilize Hidden Markov Models (HMM) in light of the previously conducted assessment of lung sounds (LS) utilizing the Mixture Gaussians Models (GMM). In particular, the application of HMM models provides robustness to cope with noise and other interferences, to which the Mixture Gaussians Models (GMM) are more vulnerable. The conducted studies document that presented quantitative assessment of LS may add in more objective and economic scanning for respiratory abnormal- ities. Keywords — Quantile Vectors, Lung Sounds, Classification, Hidden Markov Models (HMM

8. **Paper Name :** Four-Layer Wrist Worn Device for Sound level and Hazardous Gases Environmental Monitoring

Author : Mostafa Haghi, Kerstin Thurow

Description: Human exposure to environmental harmful factors (e.g. air pollu- tion and high sound levels) which are known as hazardous might cause many chronic diseases (e.g. asthma) and mental health disorders (e.g. anxiety) in particular for people who are exposed for a long time. However, the use of fixed environmental stations is limited due to large required facilities and high cost. In addition, these systems do not provide detailed monitoring of individuals. A new generation of low cost portable devices has recently been introduced to the market. Due to restriction in the size, battery life time and single task (limited number of parameters) they are not suitable for laboratory and clinical work places. In this paper, we introduce the device "MLMS-EMGN-4.0" which is wrist worn and monitors several physical and chemical environmental parameters (air humidity, temperature, air pressure, sound level, CO and NO2) as well as motion tracking. The device is based on a multi-layer approach where the sensors are located appropriately on top of each other through a board to board connector. Furthermore, the device is equipped with a notification system for real time user warning. The collected data are sent to a smartphone for logging and monitoring. Keywords-wearable device; environmental monitoring; hazardous gases; sound pressure level, sensor

1.3 PROJECT UNDERTAKEN

1.3.1 Problem Definition

Noise pollution is generally defined as regular exposure to elevated sound levels that may lead to adverse effects in humans or other living organisms. airports, with constant elevated sounds from air traffic, i.e. planes taking off or landing. workplace sounds, often common in open-space offices.

1.3.2 Scope Statement

IoT is the interconnection of computing gadgets that communicates the data to the cloud. Data such obtained by IoT is processed to perform necessary actions. The important problem in developing countries like India is pollution like air pollution and sound pollution. Continuously monitoring the air and sound pollution can help to give a proper solution to the problem. System which monitors the air and sound pollution can help to reduce the country's pollution.

CHAPTER 2
PROJECT PLANNING

2.1 INTRODUCTION

This chapter covers the project planning and management details. It also covers System Requirement specifications. SRS is considered as the base for the effort estimations and project scheduling

2.1 SYSTEM REQUIREMENT SPECIFICATION (SRS)

2.1.1 External Interface

Requirements

2.1.2 HARDWARE

REQUIREMENTS:

- Raspberry Pi
- MQ9
- Temperature sensor
- sound sensor
- Buzzer
- MQ135
- GSM

SOFTWARE REQUIREMENTS:

- Proteus 8.11
- Programing language: Python

2.1.3 Performance Requirements

Performance of the functions and every module must be well. The overall performance of the hardware will enable the users to work efficiently

.

2.1.1 Safety Requirements

The application is designed in modules that are fixed easily. This makes it easier to install and update new functionality if require

2.3 PROJECT PROCESS MODELING

We are using a waterfall model for our project.

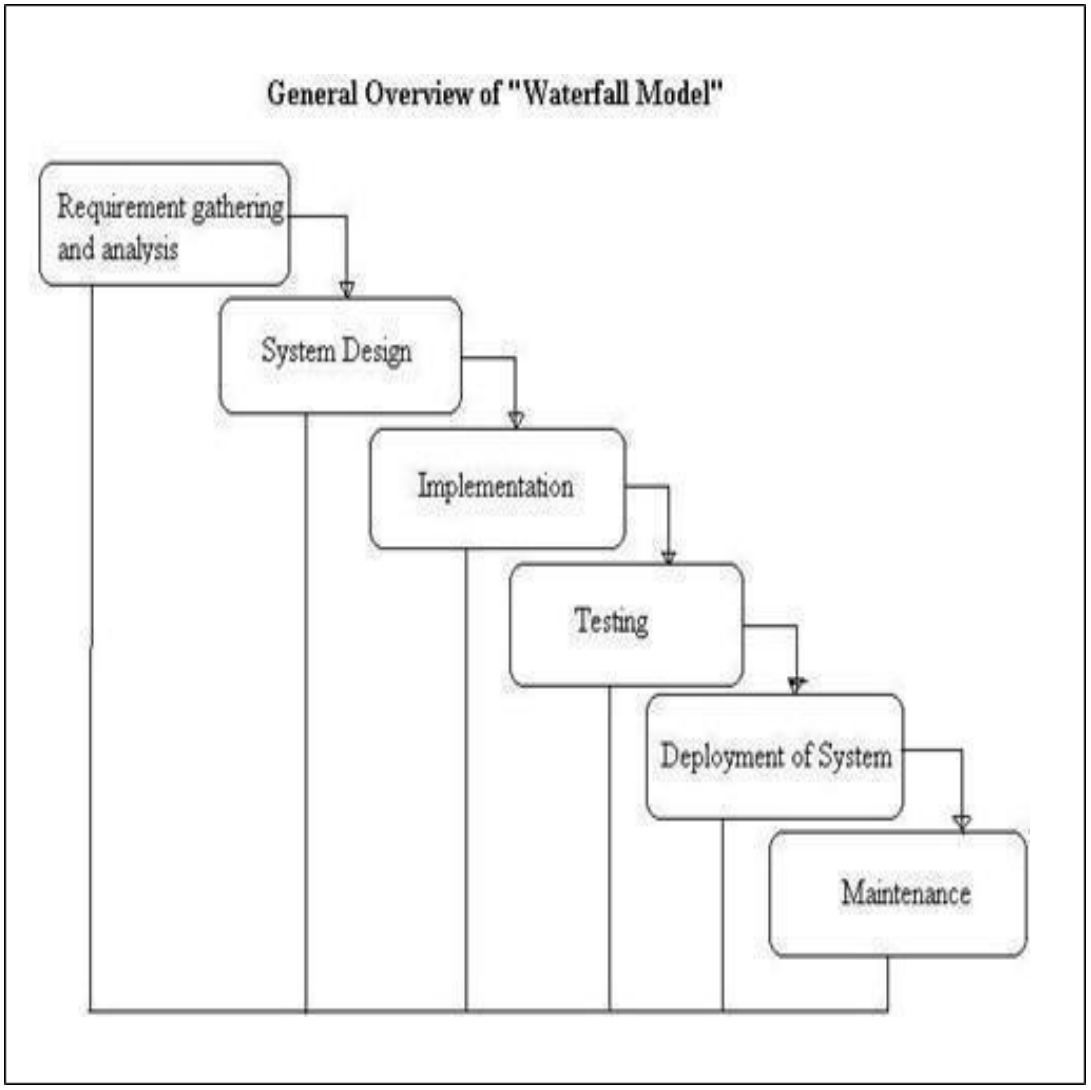


Figure 2.1: Waterfall Model

The Waterfall Model was the first Process Model to be introduced. It is also re- ferred to as a linear-sequential life cycle model. It is very simple to understand and use. In a waterfall model, each phase must be completed fully before the next phase can begin. This type of model is basically used for the project which is small and there are no uncertain requirements. In this model the testing starts only after the development is complete. In waterfall model phases do not overlap

Phases In Waterfall Model

1. Information Gathering: In this we gather the information required to our system.
2. Design: After gathering the information required we design the model based upon that information.
3. Implementation: In this phase we actually implement the system using the design done in the design phase.
4. Testing: In this phase we perform the unit as well as integration testing to check whether the system is working as per our requirement or not.
5. Deployment: After testing the system we deploy the system in the market
6. Maintenance: According to user feedback maintenance will be done

2.1 SYSTEM IMPLEMENTATION PLAN

The System Implementation plan table, shows the overall schedule of tasks compilation and time duration required for each task.

Sr. No.	Name/Title	Start Date	End Date
1	Preliminary Survey		
2	Introduction and Problem State- ment		
3	Literature Survey		
4	Project Statement		
5	Hardware Requirement And Speci- fication		
6	System Design		
7	Partial Report Submission		

8	Architecture Design		
9	Implementation		
10	Deployment		
11	Testing		
12	Paper Publish		
13	Report Submission		

CHAPTER 3
ANALYSIS DESIGN

3.1 BLOCK DIAGRAM

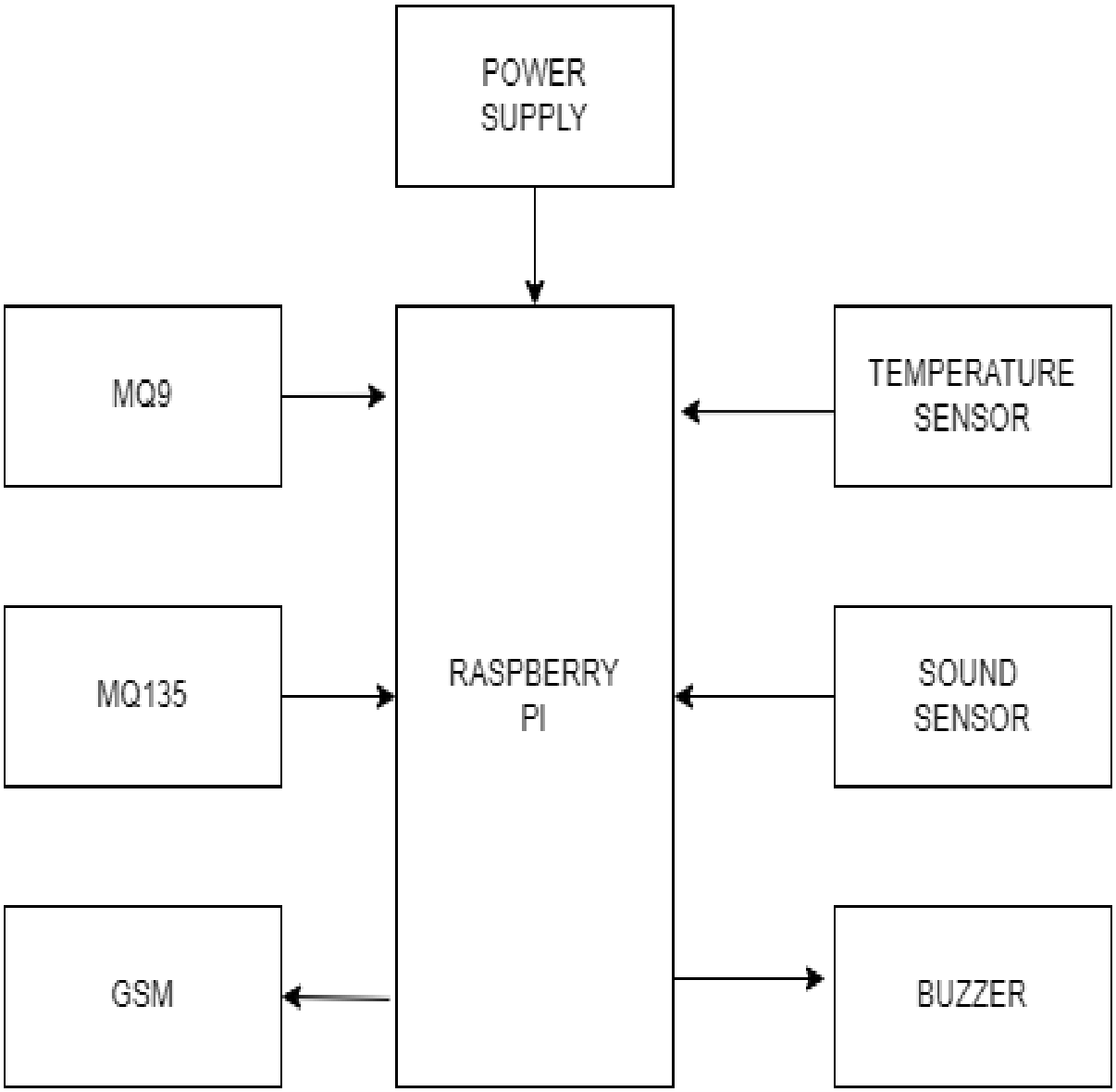


Figure 3.1: Block Diagram

3.1 BLOCK DIAGRAM EXPLANATION

System detects air and sound pollution. Raspberry Pi is the main processor. Raspberry pi has GPIO pins where all the sensors and output devices are connected. In the project MQ9 and MQ135 are the two sensors used to detect the air pollution. MQ9 is the sensor which detects air pollution due to gasses like methane, carbon monoxide. MQ135 is the gas sensor which detects NH3, CO2 , NOx gases . These sensors are given as input to the raspberry pi. Sound sensor used to detect the sound pollution and given as input to the raspberry pi. Buzzer is attached to the system which gives an alert if the pollution level rises too high. Also the system is featured with the technology that sends alert messages on the municipality mobile. So the required action will be taken.

3.1.1 Circuit Diagram

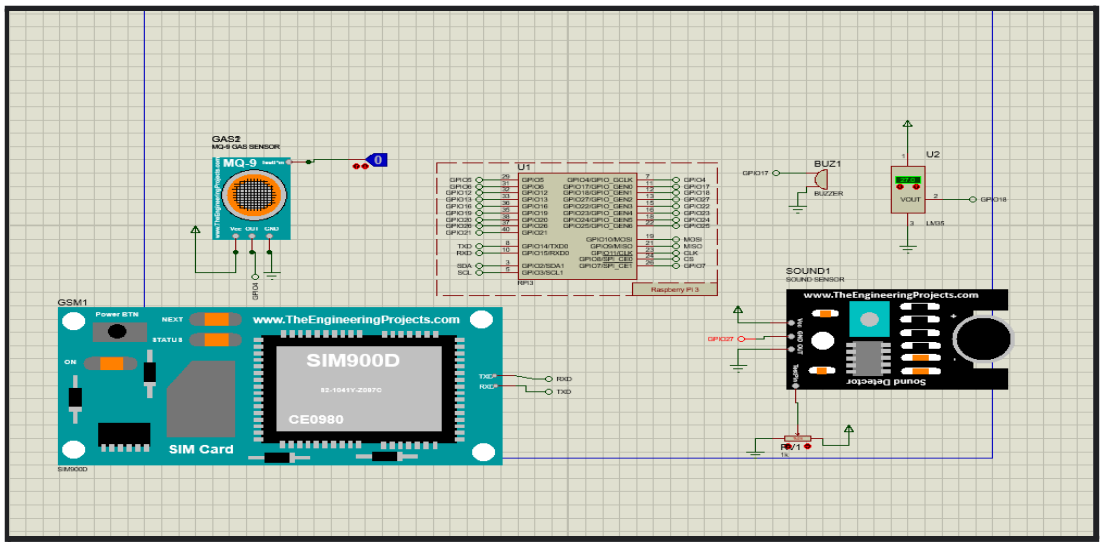


Figure 3.2: Circuit Diagram

3.3 COMPONENTS REQUIREMENTS:

3.3.1 Hardware Requirement

3.3.1.1 Raspberry Pi What is Raspberry Pi?

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python.

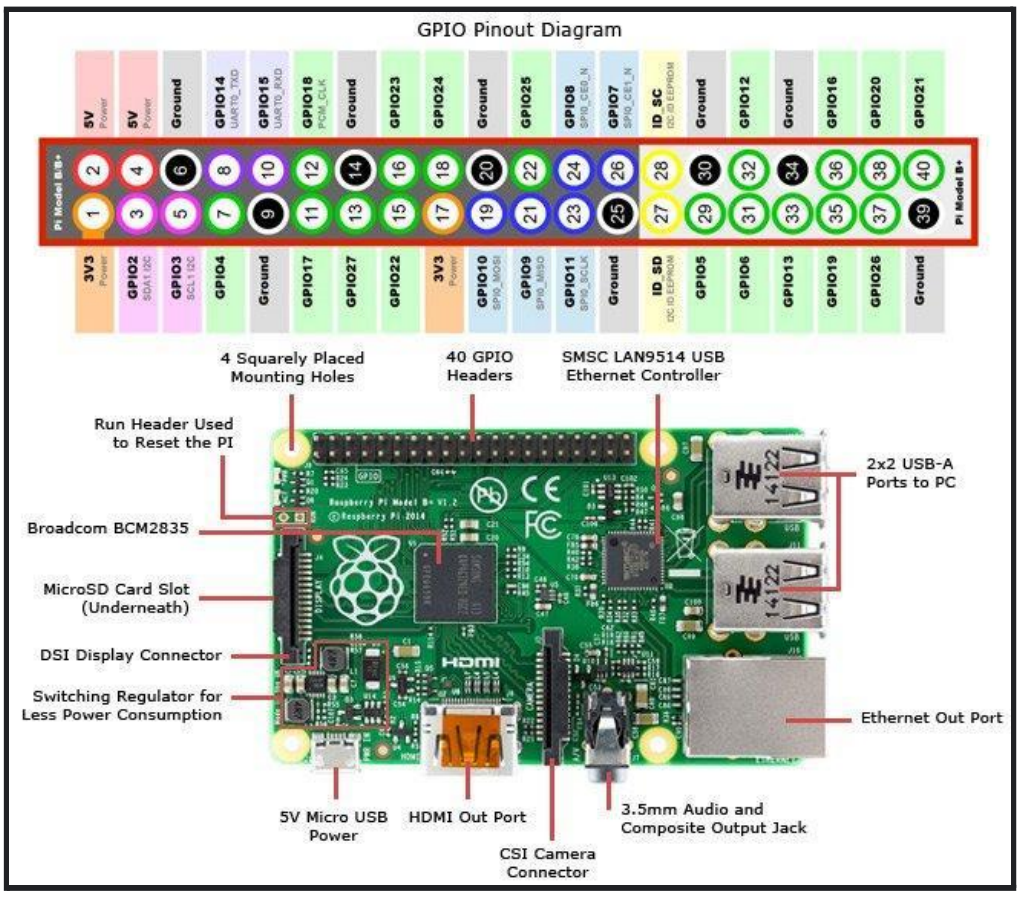


Figure 3.3: Raspberry pi

3.1.1.1 **MQ9 Sensor**

What is a MQ9 Sensor?

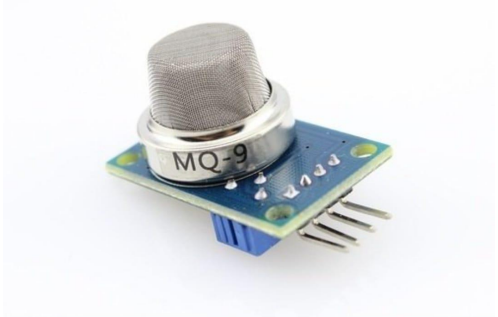
This MQ-9 Carbon Monoxide, Methane, and LPG Gas Sensor Module can be used to sense Carbon Monoxide and Methane Gas. Sensitive material of the MQ9 gas sensor is SnO2, which has lower conductivity in clean air.

It makes detection by the method of cycle high and low temperature, and detect CO when the low temperature (heated by 1.5V). The sensor's conductivity is higher along with the gas concentration rising.

When a high temperature (heated by 5.0V), it detects Methane, Propane, etc. combustible gas and cleans the other gases adsorbed under low temperature.

FEATURES :

1. Good sensitivity to CO/Combustible Gas.
2. High sensitivity to Methane, Propane, and CO Long life.
3. low cost.
4. Simple drive circuit.



3.1.1.2 **Temperature Sensor**

Q. What is a temperature Sensor?

LM35 is an integrated analog temperature sensor whose electrical output is propor- tional to Degree Centigrade. LM35 Sensor does not require any external calibration or trimming to provide typical accuracies. The LM35's low output impedance, lin- ear output, and precise inherent calibration makes interfacing to readout or control circuitry especially easy.

Temperature Sensor specifications:

1. Calibrated directly in Degree Celsius (Centigrade)

2. Linear at 10.0 mV/°C scale factor

3. 0.5°C accuracy guarantee-able (at a25°C) Rated for full -55°C to a 150°C range Suitable for remote

Applications:

Low cost due to wafer-level trimming Operates from 4 to 30 volts

Figure 3.4: Temperature sensor

3.3.1.4 Sound Sensor:

Q.What is a sound Sensor?

A sound sensor is defined as a module that detects sound waves through its intensity and converts them to electrical signals. But do you know how sound sensors work? What is it used for? and How to pair a sound sensor with a Raspberry Pi? Fear not, with today's guide, I'll be answering all of these questions!

sound Sensor work

Sound detection sensor works similarly to our Ears, having a diaphragm which converts vibration into signals. However, what's different is that a sound sensor consists of an in-built capacitive microphone, peak detector and an amplifier (LM386, LM393, etc.) that's highly sensitive to sound.

With these components, it allows for the sensor to work:

Sound waves propagate through air molecules Such sound waves cause the diaphragm in the microphone to vibrate, resulting in capacitance change Capacitance change is then amplified and digitalized for processing of sound intensity sound Sensor used

Apart from building various electronic projects with Raspberry Pi(covered in the later section) and more, sound sensors are used in many other day to day applications including:

Consumer electronics such as phones, computers, music systems Security and Monitoring systems such as burglar alarms, door alarms, etc. Home automation such as lighting your house by detecting whistle/clap instead of physically turning the light switch Ambient sound recognition and sound level recognition. sound Sensor model

Based on the power amplifier LM386, the Grove – sound sensor module is a simple, low powered, and highly compatible option suitable to easily kickstart your next sound sensing project!

With a wide voltage range and adjustable output by the potentiometer, it's readily capable of detecting the sound strength of the environment!

Its features include:

Grove compatible interface Saeed's own plug and play system, no soldering or jumper wires needed for pairing as compared to other sound sensor breakout boards Analog output signal Wide supply voltage range: 4V-12V Low quiescent current drain: 4mA 2.0cm x 2.0cm twig module Minimum external parts

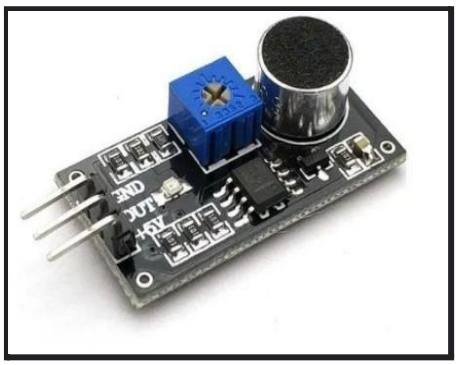


Figure 3.5: Sound sensor

3.3.1.5 What is MQ135?

The MQ series of gas sensors utilize a small heater inside with an electrochemical sensor. These sensors are sensitive to a range of gases used at room temperature. MQ135 alcohol sensor is a Sno2 with a lower conductivity of clean air. When the target explosive gas exists, then the sensor's conductivity increases more increasing more along with the gas concentration rising levels. By using simple electronic circuits, it converts the charge of conductivity to correspond to the output signal of gas con- centration The MQ135 gas sensor has high sensitivity in ammonia, sulfide, benzene steam, smoke, and in other harmful gasses. It is low cost and suitable for different applications. There are different types of alcohol sensors like MQ-2, MQ-3, MQ-4, MQ-5, MQ-6, etc.

MQ135:The MQ-135 gas sensor senses gases like ammonia nitrogen, oxygen, alcohols, aromatic compounds, sulfide, and smoke. The boost converter of the chip MQ-3 gas sensor is PT1301. The operating voltage of this gas sensor is from 2.5V to 5.0V. The MQ-3 gas sensor has a lower conductivity to clean the air as a gas sens- ing material. In the atmosphere, we can find polluting gases, but the conductivity of the gas sensor increases as the concentration of polluting gas increases. MQ-135 gas sensors can be implemented to detect the smoke, benzene, steam, and other harmful gases. It has the potential to detect different harmful gases. The MQ-135 gas sensor is a low cost to purchase. The basic image of the MQ-135 sensor is shown in the below figure.

Figure 3.6: MQ135

3.3.1.6 GSM

What is GSM?

GSM (Global System for Mobile communication) is a digital mobile network that is widely used by mobile phone users in Europe and other parts of the world. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies: TDMA, GSM and code-division multiple access (CDMA). GSM digitizes and compresses data, then

sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 megahertz (MHz) or 1,800 MHz frequency band. GSM, together with other technologies, is part of the evolution of wireless mobile telecommunications that includes High-Speed Circuit-Switched Data (HSCSD), General Packet Radio Service (GPRS), Enhanced Data GSM Environment (EDGE) and Universal Mobile Telecommunications Service (UMTS).

Working of GSM:

The GSM network has four separate parts that work together to function as a whole: the mobile device itself, the base station subsystem (BSS), the network switching subsystem (NSS) and the operation and support subsystem (OSS).

The mobile device connects to the network via hardware. The subscriber iden- tity module (SIM) card provides the network with identifying information about the mobile user.The BSS handles traffic between the cellphone and the NSS. It consists of two main components: the base transceiver station (BTS) and the base station controller (BSC). The BTS contains the equipment that communicates with the mobile phones, largely the radio transmitter receivers and antennas, while the BSC is the intelligence behind it. The BSC communicates with and controls a group of base transceiver stations.

The NSS portion of the GSM network architecture, often called the core net- work, tracks the location of callers to enable the delivery of cellular services. Mobile carriers own the NSS. The NSS has a variety of parts, including mobile switching center (MSC) and home location register (HLR). These components perform different functions, such as routing calls and Short Message Service (SMS) and authenticating and storing caller account information via SIM cards. Because many GSM network operators have roaming agreements with foreign operators, users can often continue to use their phones when they travel to other countries. SIM cards

that hold home network access configurations may be switched to those with metered local access, significantly reducing roaming costs, while experiencing no reductions in service.

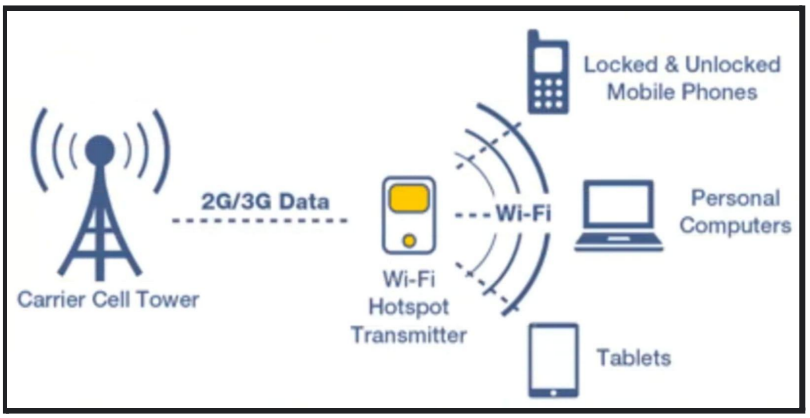


Figure 3.7: GSM

3.3.1.7 BUZZER

What is BUZZER?

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

BUZZER specifications:

1. Voltage V 5V working voltage of the board:

2. 23.5mm*13mm 1.27mm-spacing 4Pin interface connected with sensor hub.

3. The CAD drawing of the sensor: File:Sensor CAD.zip Technical parameters

4. Drive with 2K 5K square wave

5. The sound frequency is controllable. Connection This sensor can be connected to

the following interfaces of core: A0 A7,D2 D13

Figure 3.8: BUZZER SENSOR

3.1.1 Software Requirement”

3.1.2 Proteus

Proteus Professional 8.11 is the simplest and most advanced software for designing circuits. In which you will have to search for components, place them in the workspace and connect these with wires. Proteus 8.11 Download free Proteus soft- ware is mostly used for designing and testing circuits.

3.3.3.1 Proteus Specifications

1. Circuit designing and testing.
2. includes all the components for circuit designing More than 800 different microcontrollers Different Simulations
3. Save cost and time for testing circuit

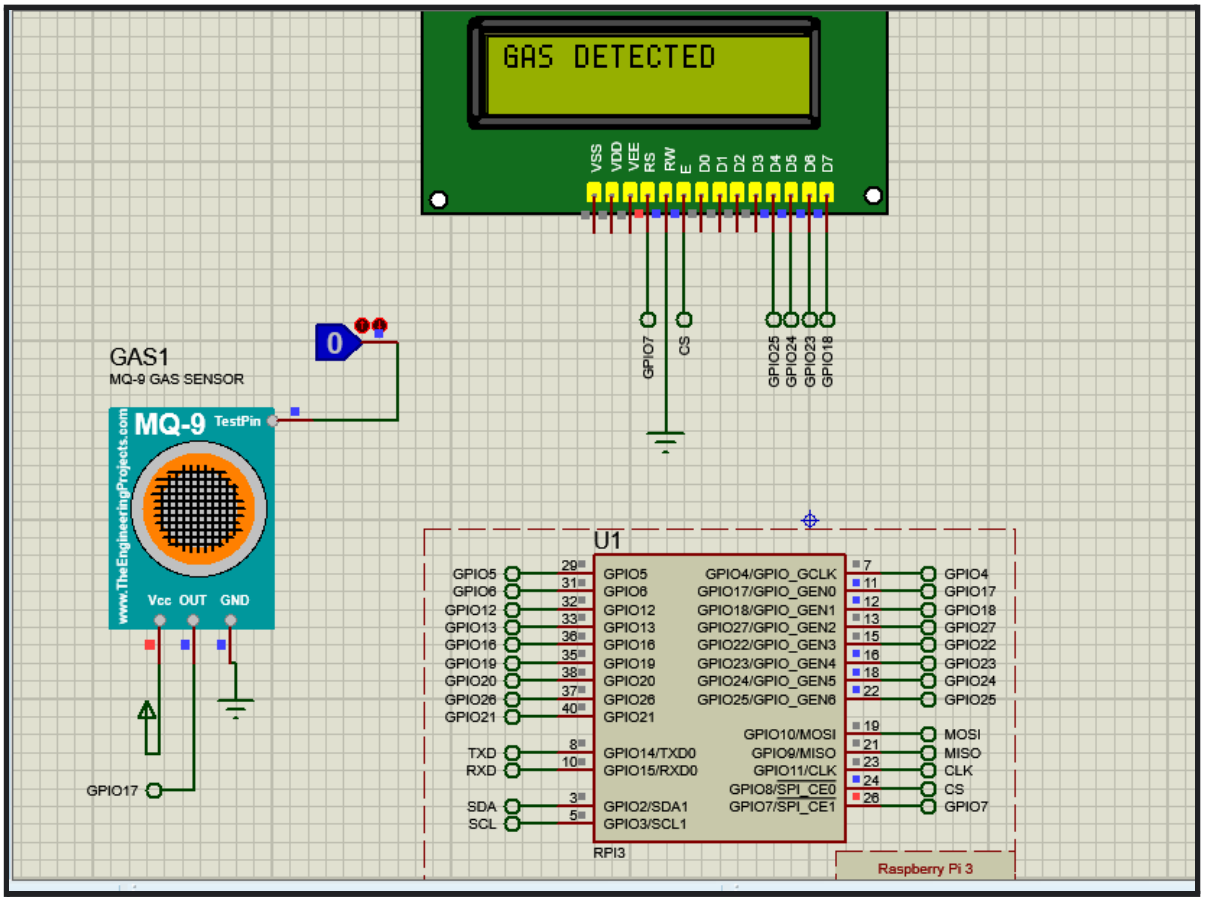
CHAPTER 4

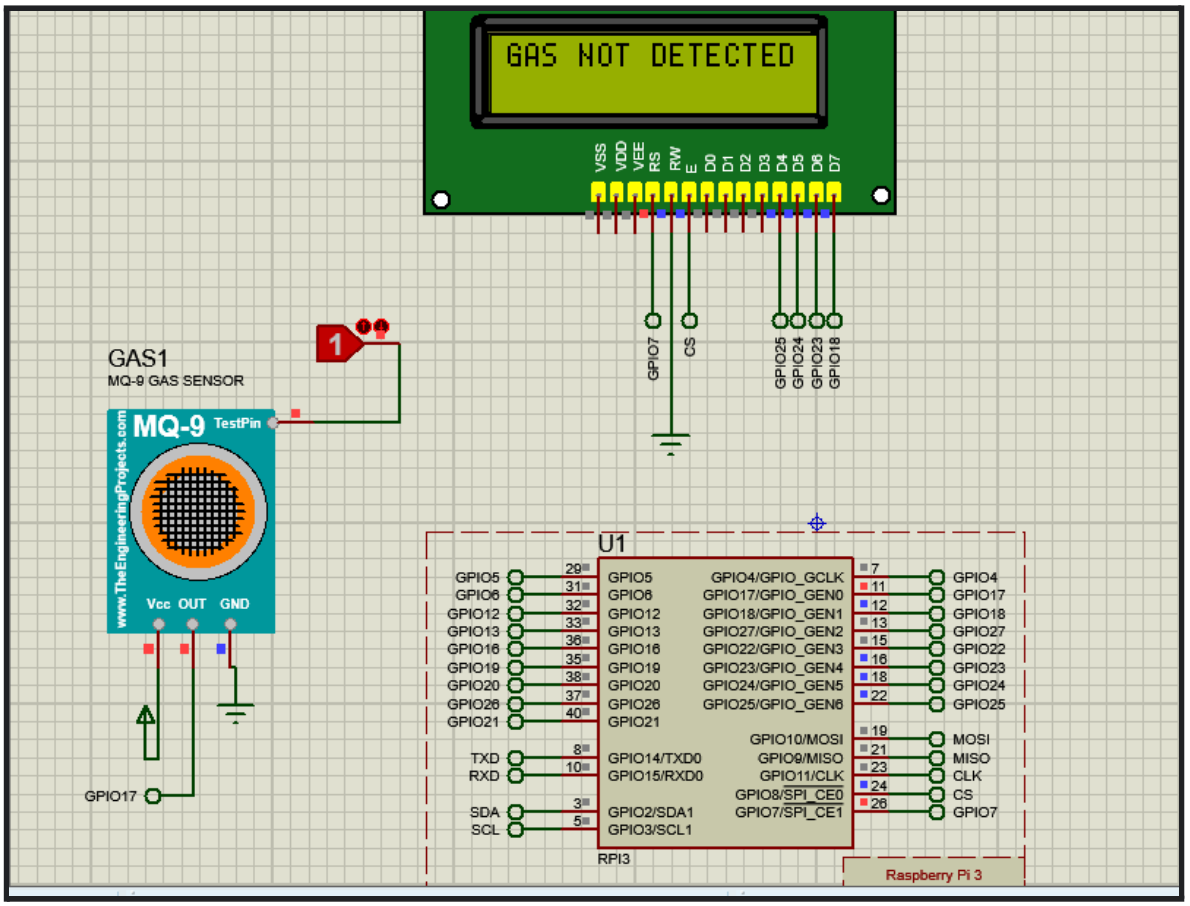
RESULT

4.1 EXPECTED RESULT:

The system should be able to detect air pollution successfully. module will be able to detect the methane,co2,c0,etc. gases pollution. After detecting this pollution system will give an alert on Display.

The type of gas the sensor could detect depends on the sensing material present inside the sensor. Normally these sensors are available as modules with comparators as shown above. These comparators can be set for a particular threshold value of gas concentration. When the concentration of the gas exceeds this threshold the digital pin goes high. The analog pin can be used to measure the concentration of the gas.





4.2 Applications:

- Weather Monitoring
- Monitor the pollution level
- Government should get an update from the system about the pollution level.
- For the Agriculture sector.
- To get healthy and hygienic life

CHAPTER 5

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