NOISE POLLUTION MONITORING SYSTEM

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INTRODUCTION

☐ Noise pollution could be a growing issue of late. it's necessary to watch the air and noise pollution levels to make sure a healthy and safe atmosphere.

☐ With the fast increase in infrastructure and industrial plants, environmental problems have greatly influenced the requirement of sensible observation systems.

☐ Thanks to its low price, high potency and flexibility, web of Things (IoT) has become extremely popular currently of late.

☐ web of Things (IoT) permits interaction between devices and humans. It forms a communication medium

- Previously, knowledge collectors had to travel long distances to the assorted locations to gather knowledge when that the analysis was done. This was drawn-out and time intense.
- But now, sensors and microcontrollers connected to the web will create environmental parameter observation additional versatile, correct and fewer time intense.
- once the atmosphere Merges with sensors and devices to self -protect and self -monitor it forms a sensible atmosphere. Embedded intelligence makes the atmosphere act with the objects. during this model, we tend to square measure employing a Raspberry

RELATED WORK

☐ There are numerous works that have been done related to IOT based air and sound pollution monitoring Projects.

☐ Varun Jain,Mansi Goel, Mukulika Maity, Vinayak Naik, Ramachandran Ramjee propose a framework to estimate air pollution for a given locality by using maximum advantages of the existing infrastructure of monitoring stations.

☐ Unfortunately, India still lacks the infrastructure required to measure pollution at a granular scale.

☐ Archit Aggarwal,TanupriyaChoudhary, Praveen Kumar Proposes a fuzzy interface system for the calculation

- The traditional method used is linear interpolation where only one pollutant is considered to calculate AQI.
- Somansh Kumar, Ashish Jasuja present work, the air quality Data from New Delhi, Mumbai, Chennai and Bengaluru has been used. Initially, dimension reduction has been performed on the data. After that, the data has been deseasonalized.
- Arnab Kumar Sahal, Sachet Sircar2, Priyasha Chatterjee3 Proposed that 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.

☐ Noise pollution is becoming a more significant concern, resulting in a slew of environmental issues such as the fog-haze weather phenomenon,which can be hazardous to human health.

☐ The design and manufacturing of a portable sensory system for air pollution monitoring that can detect temperature, humidity, and particle matter is the topic of this research(PM).

☐ It detecting impurities using gas sensor. The sensor is connected to the Arduino which consist of code which will help us in detecting the amount of impurities in the air.

☐ Baihaqi Siregar says wireless sensor network(WSN) utilizing wasp mote smart cities device, connected with

METHODOLOGY

- The project is geared toward developing a system capable of Monitoring pollutants within the air and noise within the sound.

- The projected System was developed exploitation Raspberry pi, sound device, Gas device and temperature device. This air quality and sound quality detection and observance System provides real time information which might be accessed from Computers and mobile devices.

- The diagram of the projected system is illustrated in Figure one.

BLOCK DIAGRAM
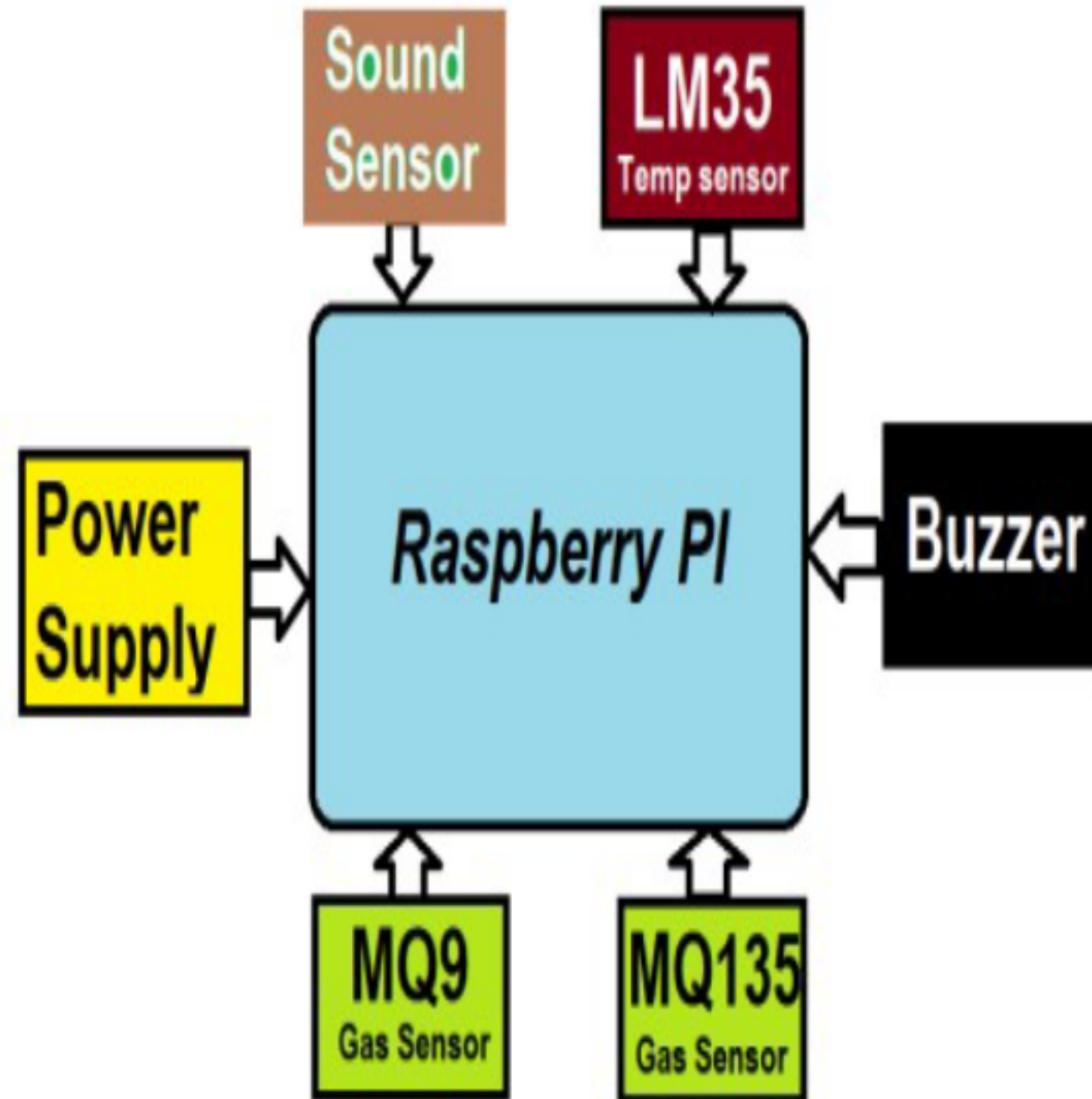
SYSTEM DESIGN

☐ The MQ135 and MQ9 Gas sensing element was accustomed collect pollution. And sound sensing element and temperature sensing element (LM35) accustomed collect sound intensity and temperature severally.

☐ The information is transmitted via LAN module that is gift in raspberry pi mistreatment the web to the cloud servers, this info may be retrieved via sensible phone or internet enabled devices.

☐ The transmission and retrieving of information happens in close to real time.

☐ The information of the parameters being measured area unit displayed on a 16*2 alphanumeric display

☐AN alarm would sound within the event once the pollution and pollution is detected And information is send to cloud storage which is easily available for anyone.

☐Also it draw the graph on thing speak site for analysis the data for government authority.

SYSTEM SPECIFICATION

1. Raspberry PI   4. Sound Sensor

2. MQ9 Sensor   5. MQ135 Sensor

3. Temp Sensor 6. Buzzer

1.RASPBERRY PI

☐ The Raspberry Pi may be a low cost, credit-card sized pc that plugs into a pc monitor or TV, and uses a customary keyboard and mouse. it's a capable very little device that permits individuals of all ages to explore computing, and to be told the way to program in languages like Scratch and Python.

2. MQ9 SENSOR

☐ This MQ-9 CO gas, Methane, and LPG Gas sensor Module are accustomed sense CO gas and aliphatic compound Gas. $SnO2$ is the sensitive material of the gas sensor MQ9, that has lower physical phenomenon in clean air. It makes detection by the maneuver of cycle high and cold, and sight CO once the cold (heated by one.5V). The sensor's physical phenomenon in clean air, the output of the gas concentration

3.TEMP SENSOR

☐ A temperature detector may be a device accustomed live temperature. this may be air temperature, liquid temperature or the temperature of solid matter. There are differing types of temperature sensors offered and them every use totally different technologies and principles to require the temperature activity. Temperature sev̶͟͞er̶ temperature in many alternativ... ...lustries.

4.SOUND SENSOR

☐A sound sensor is defined as a module that detects sound waves through its intensity and converts them to electrical signals.

☐Sound detection sensor works similarly to our Ears, having a diaphragm which converts vibration into signals.
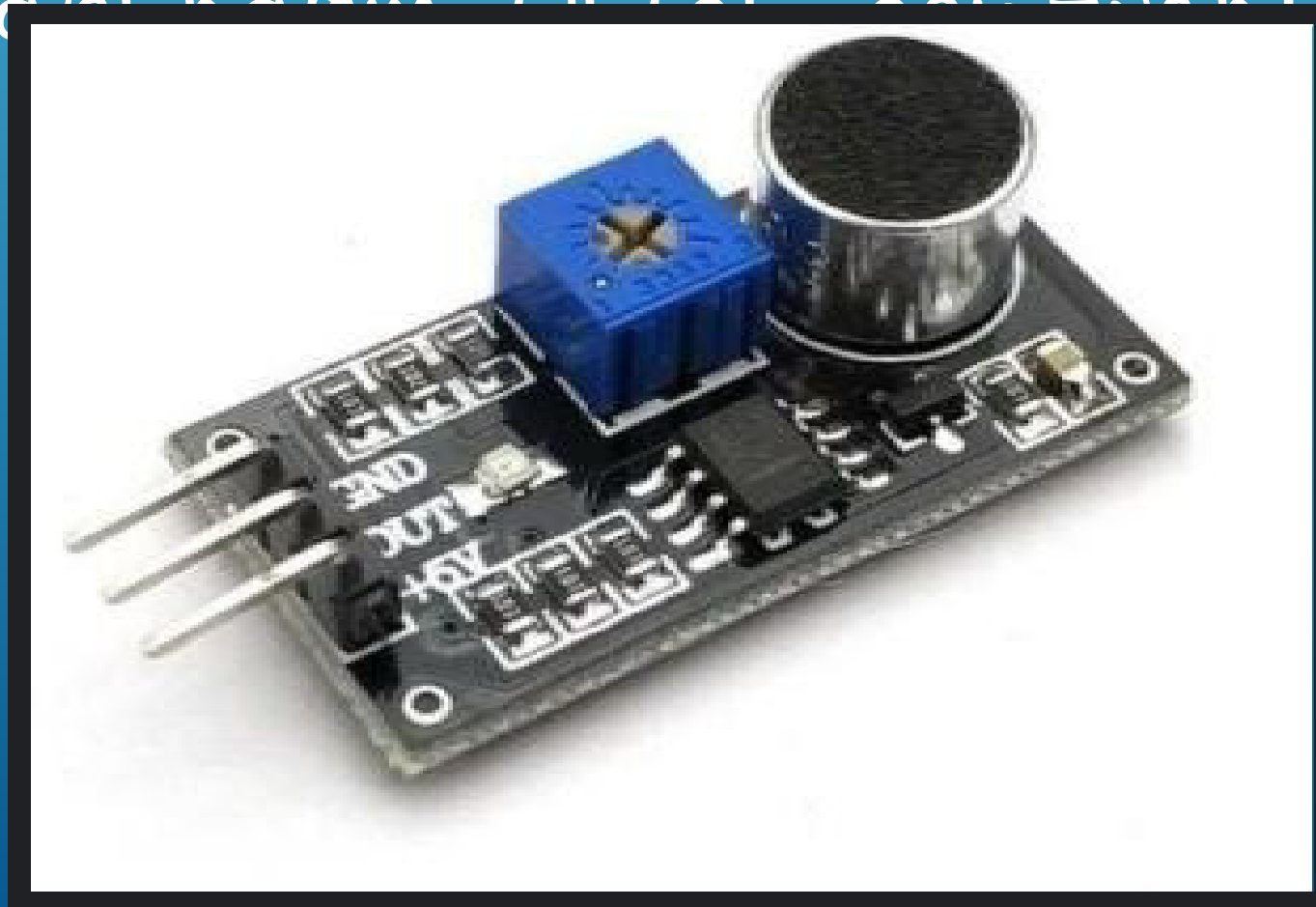
5.MQ135 SENSOR

☐ The MQ series of gas devices utilize a touch heater inside with associate natural science detector. These sensors square measure sensitive to a spread of gases used at temperature. MQ135 alcohol device is also a SnO_2 with a lower natural phenomenon for contemporary air.

MQ-135 Gas Sensor

6.BUZZER

☐ The buzzer could be a sounding device that may convert audio signals into sound signals. it's sometimes power driven by DC voltage.

☐ it's wide utilized in alarms, computers, printers and alternative electronic merchandise as sound devices.

PROGRAM

```python
import sounddevice as sd
import numpy as np
import time
import requests

# Replace with your server URL
server_url = "https://your-server.com/api/noise"

# Parameters for audio recording
sample_rate = 44100 # Samples per second
duration = 10 # Duration of each recording in
seconds threshold = 0.05 # Adjust this value as needed
def record_audio():
    print("Recording audio...")
    audio_data = sd.rec(int(duration * sample_rate), samplerate=sample_rate, channels=2,
    dtype='int16') sd.wait()
    return audio_data
```

```python
def calculate_noise_level(audio_data):
    rms = np.sqrt(np.mean(audio_data**2))
    return rms

def send_data_to_server(noise_level):
    data = {"noise_level": noise_level}
    try:

        response = requests.post(server_url, json=data)
        if response.status_code == 200:
            print("Data sent to the server successfully.")
        else:
            print("Failed to send data to the server.")
    except requests.exceptions.RequestException as e:
        print(f"Error: {e}")
```

```python
while True:
    audio_data = record_audio()
    noise_level = calculate_noise_level(audio_data)
    print(f"Noise Level: {noise_level}")

    if noise_level > threshold:

        print("Noise level exceeded threshold. Sending data to the server...")
        send_data_to_server(noise_level)

    time.sleep(30)  # Adjust the sleep time as needed
```
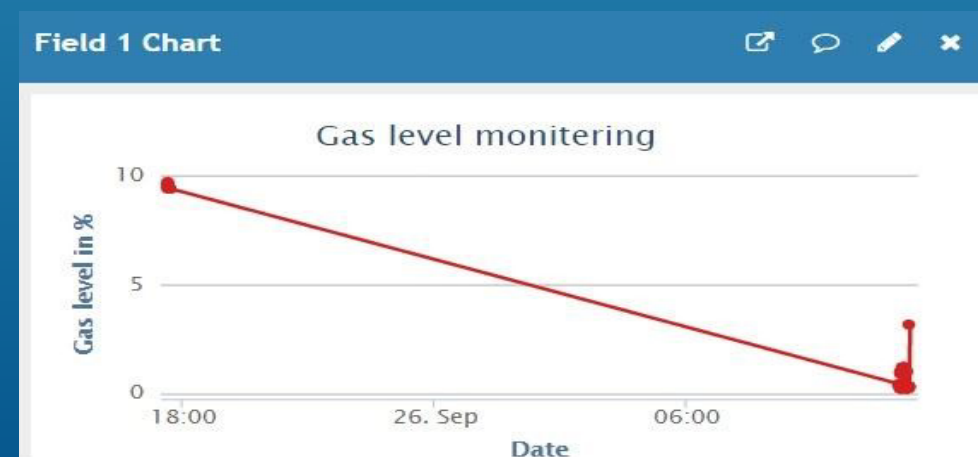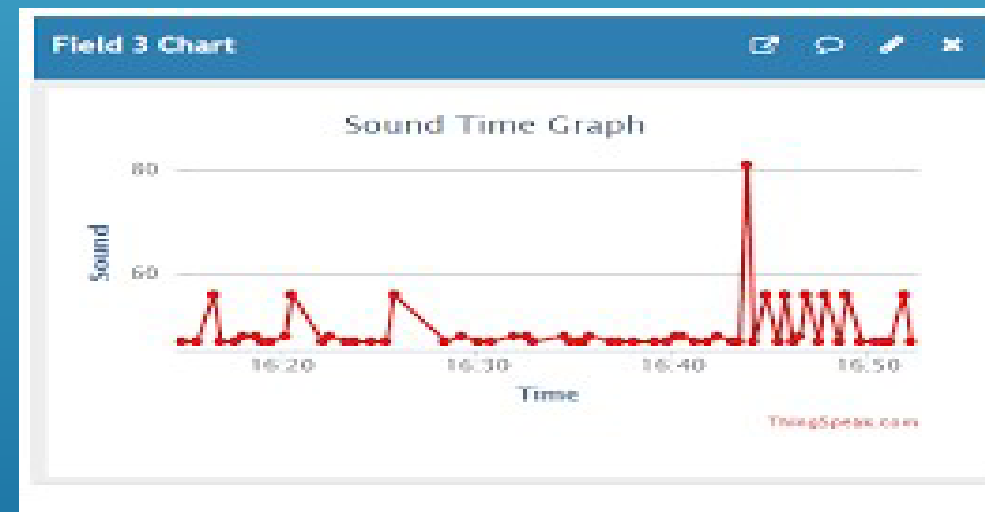
RESULT

□ The detected air pollution, sound pollution and temperature are displa[yed]

CONCLUSION

☐ The smart because of monitor setting and a cheap, low price embedded system is given with fully completely different models throughout this paper. at intervals the projected style functions of assorted modules were mentioned.

☐ The noise and pollution observation system with internet of Things (IOT)concept through an experiment tested for observation 2 parameters. It additionally sent the device parameters values to the cloud.

☐ This information are going to be useful for future analysis and it will be simply shared to alternative finish users.

☐ This model will be additional