

Advanced Air Pollution Detection using IOT and Raspberry PI



Ali AbaasAboodee Al-Zaheiree, Yasir Ahmed Taha AL-Zubaidi, S.S.Gaikwad, R.K.Kamat

Abstract: Air pollution becomes more complicated nowadays in many applications. In India, many cities are affecting air pollution. This is the increasing problem day by day. Various measures are taken to calculate the air quality and more preventative measures to be taken to control air pollution. Many air quality measures are taken to overcome the pollution but till now no improvement in the air quality is observed. In this paper, an enhanced air quality detection system is introduced to find the air polluted gases present in the environment. Air quality index was sensed gases like MQ2, MQ135, MQ7, etc. and displayed each and every calculation in the LCD display. New integrated technology is introduced with the integration of IoT to overcome the pollution problem.

Keywords: MQ2, MQ135, MQ7..

I. INTRODUCTION

The fundamental target of IoT Pollution Monitoring System is that the Air contamination is a rising issue nowadays. It is obligatory to screen air quality [1],[2] and monitor it for a more beneficial future and solid living for all. Web of things (IoT) is picking up prominence step by step as it can change life making it simpler for people.

With the development of populace and with the expansion in the cars and ventures the air conditions are impressively breaking down step by step. Unsafe impacts of contamination incorporate a few hypersensitive responses causing aggravation of the eyes, nose, and contaminations of the throat. It can likewise prompt irritation inside the lungs clearing approach to issues like bronchitis, heart ailments, pneumonia, lung and disturbed asthma[6]. This contamination related issues can be tended to by having a productive checking framework. Watching gives estimations of air toxin focuses, which can at that point be analyzed, translated and introduced. Observing of the condition by a savvy framework enables us to quantify the furthest point of air contamination which can be utilized to create systems to lessen it.

II. INTERNET OF THINGS (IOT)

The IoT is the most widely used in various internet-based mobiles, vehicles, sensors, and other hardware devices. This can be integrated with the various machine learning and deep learning algorithms to improve the performance of the system.

Each factor is unambiguously diagnosable through its installed framework anyway is prepared to interoperate inside the present web foundation. Specialists gauge that the IoT can include essentially fifty billion articles by 2020. The origination of the Internet of things ended up a standard in 1999, through the Auto-ID Center at college and associated showcase investigation distributions.

III. LITERATURE SURVEY

Air quality observing frameworks that can screen gas, for example, CO and Sox on surrounding air in a constant and can be gotten to with web line have been created [1]. Sensor component on this framework depends on Nanostructured zinc oxide meager film combined utilizing the wet substance course. The checking framework is structured utilizing Arduino Uno microcontroller as simple to the advanced converter, and ethernet shield for information transmission, PC server for database focus and information secure. The information from this watching framework is gotten to and saw as a site page. The detecting component that utilized in this technique is shaped at nanostructure along these lines it'll yield high affectability. The ideal trial parameters that will be utilized are temperature, introduction time to gas target, examining period, and furthermore proportion for recovery time. Estimations will be held under well-controlled and misleadingly CO contaminated air.

Because of the expanding industrialization and along these lines the immense urbanization, contamination recognition is being considered on the whole of the key difficulties of reasonable urban communities [2]. Numerous contamination recognition frameworks are arranged inside the writing, among that remote gadget systems have all the earmarks of being the main goal. Cautious arrangement of sensors is, along these lines, important to show signs of improvement Performances while guaranteeing a negligible budgetary expense. In this paper, the citywide remote sensor systems are considered and handle the base cost hub situating issue for air contamination observing. The proposed framework has a productive methodology that plans to discover ideal sensors and sinks areas while guaranteeing air contamination inclusion and system availability.

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In contrast to the vast majority of the common ways, that guess direct and nonexclusive recognition models, our methodology is predicated on the spacial investigation of contamination information, allowing to require into the record the idea of the contamination marvel.

A Wi-Fi-based fitting and sense savvy gadget for devoted air contamination checking to utilize the Internet of Things is structured [3]. This framework structured on a gadget to cloud plan in IoT for watching contamination precisely.

When the sensor hub peruses singular toxins structure and area facilitates, Air quality index (AQI) will be determined to utilize a straight portioned guideline with more noteworthy Vancouver AQI table and max administrator collection strategy. In view of AQI esteem, the comparing LED will be impelled for sign and wellbeing sway with precautionary measure steps messages will be shown on the screen. Every one of that information will be pushed to thing talk distributed storage, an open-source application Programming interface for IoT based gadgets. This pushed data related to Date and time will be recovered as a different stand out sheet for future investigation. Through issue read golem application, ongoing contamination level with the area can be imagined as far as a line diagram.

Air contamination influences our everyday exercises because of overwhelming contaminants and personal satisfaction additionally influenced. It represents a risk to the plan and consequently the personal satisfaction on the

earth. The critical got the opportunity to screen air quality is very obvious, in light of expanded mechanical exercises over the previous years. Individuals got the chance to perceive the degree that their exercises affect air quality [4]. This undertaking proposes air contamination observing framework. The framework was created utilizing the Arduino microcontroller. The contamination recognition framework was intended to watch and dissect air quality in period and log data to a faraway server, keeping the data refreshed over the net. Air quality estimations were taken bolstered the segments per Million (PPM) measurements and dissected exploitation Microsoft stick out. The air quality estimations taken by the planned framework was right. The outcome was appeared on the planned equipment's showcase interface and will be gotten to by means of the cloud on any great cell phone.

IV. PROPOSED SYSTEM

The proposed system utilizes the sensors for sensing the hazardous gases which are more harmful to the human's life. By the inputs taken from the sensors and send to the Screen. After the execution of the code the parameter concentration of smoke exceeds the normal range then the analog values are generated. For every 30s the sensor will update the values by sensing the air. The generated values are stored in the data base so that the authorized person can easily accesses the data from anywhere. And also the graph is generated from the generated values.

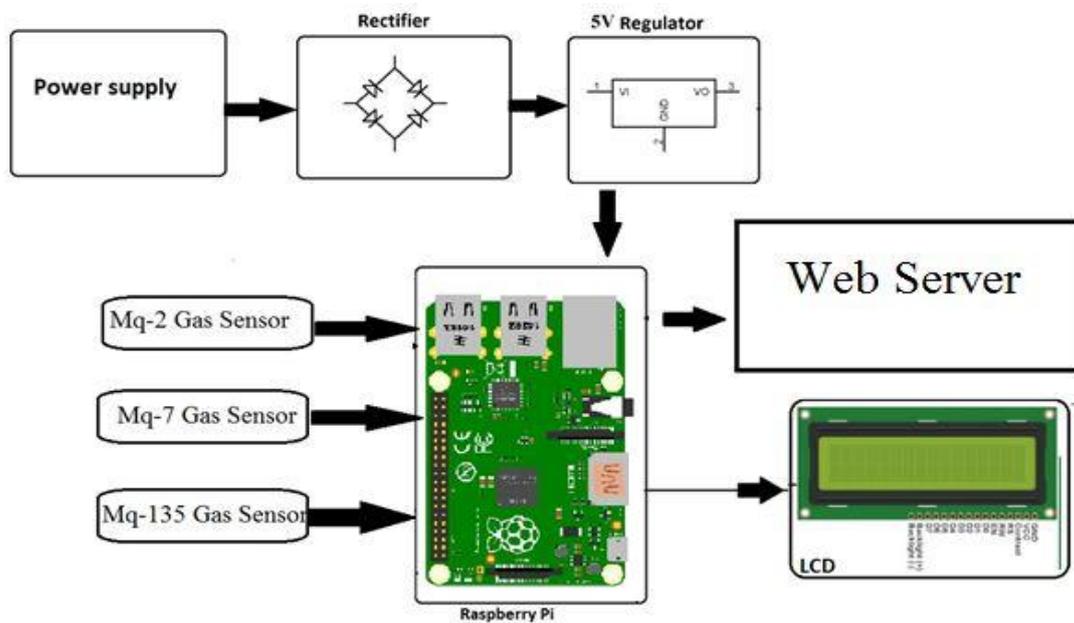


Figure: 2 Block Diagram for proposed system

Technical data for MQ2 gas sensor

Features:

- Wide recognizing degree
- Long and stable life
- Fast reaction and high affectability
- Simple circuit

V. RESULTS

This Shows the complete setup of the Air Quality Monitoring System Based on the Iot Using Raspberry pi that contains Mq-2 Gas sensor , Mq-7 Gas Sensor and Mq-135 Gas Sensor and finally placed on the board for easy to use and Convince.

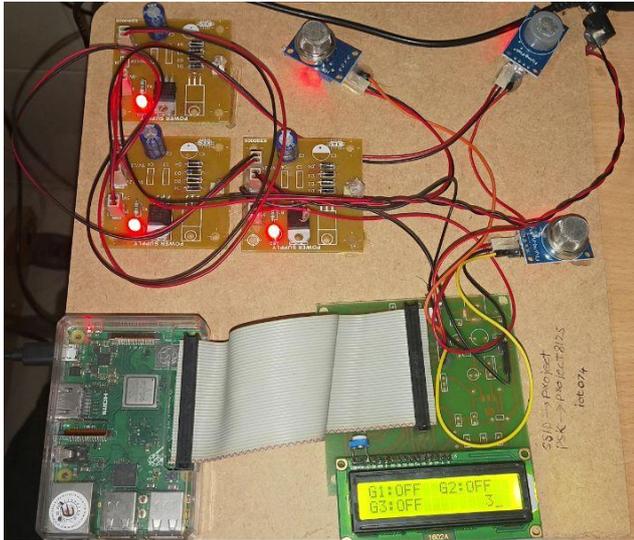


Figure: 3 Overview of the air quality monitoring system based on IoT using raspberry pi

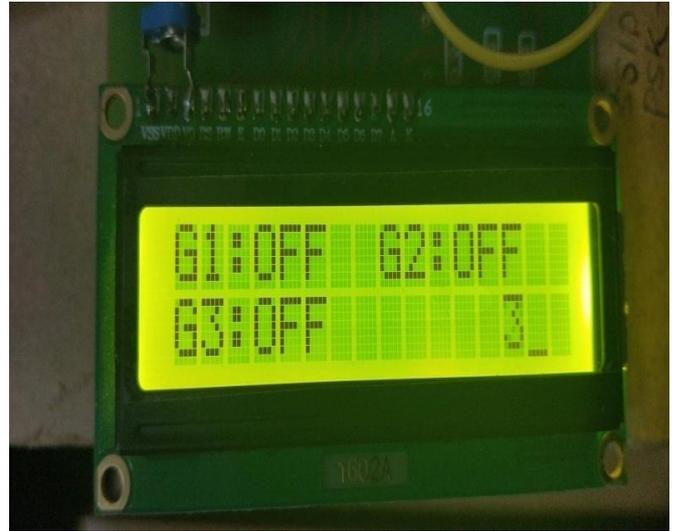


Figure: 4 Initial Display screen

A. Standard work condition

Symbol	Parameter name	Technical condition	Remarks
Vc	Circuit voltage	5V at 100mA	AC or DC
VH	Heating voltage	5V at 100mA	AC or DC
RL	Load resistance	Can adjust	
RH	High resistance	33Ω±5%	Room temperature
PH	Heating compositions	Less than 800mw	
Rs	Sensing resistance	3KΩ-30KΩ	

Table: 1 Standard work conditions for MQ2 gas sensor

B. Detecting range of MQ2 gas sensor

Gas	Range
LPG	200ppm to 5000ppm
Butane	300ppm to 5000ppm
Methane	5000ppm to 20000ppm
Alcohol	10ppm to 300ppm

Table: 2 Gas detecting ranges of MQ2 gas sensor

For every Gas sensor we can generate the Graph for easy identification. By clicking the Switch to graph view button from the home page it can easily generate the graph.

Hello.. iot074

[Logout](#) [Switch to Table View](#)

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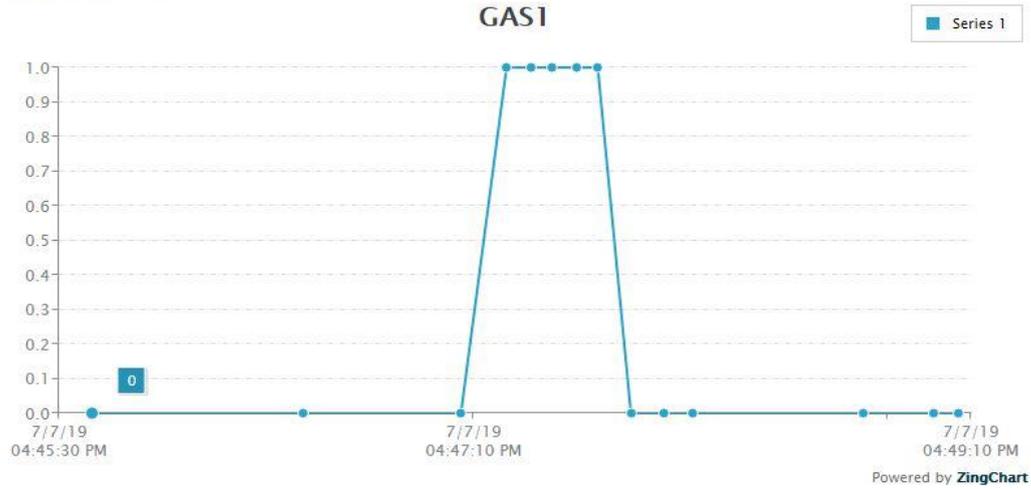


Figure: 5 Screenshot for MQ2 gas sensors graph



Figure: 6 Screenshot for MQ7 gas sensor graph

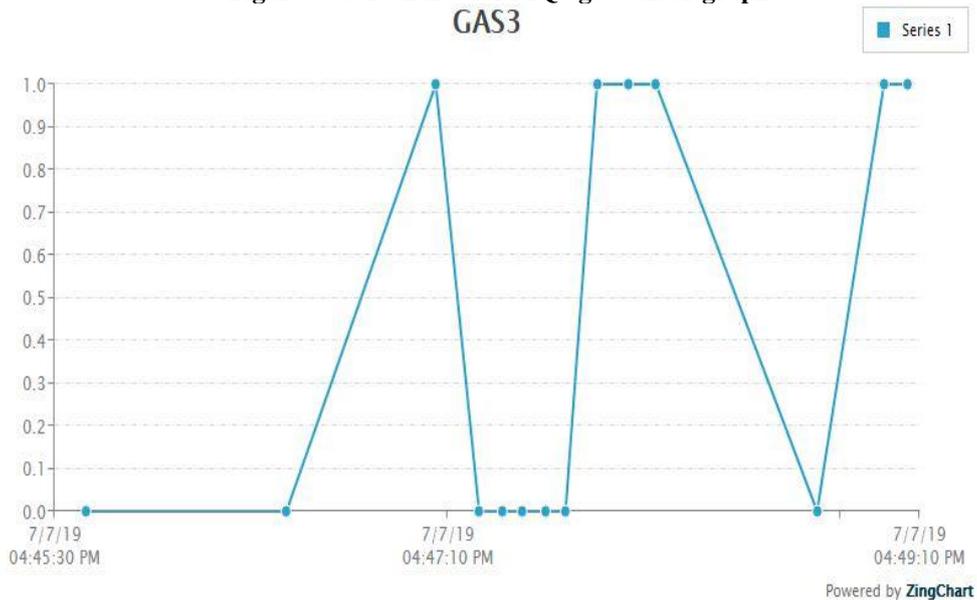


Figure: 7 Screenshot for MQ135 gas sensor graph

VI. CONCLUSION

In this paper, the integrated IoT air pollution system is developed to overcome the issues in air quality. The sensors mainly sense the various dangerous gases present in the environment. These sensors can likewise be executed in automatons which can move around and recognize the contaminating gases in the earth. Safety efforts can be upgraded to secure the information that is being sent through the segments by presenting new conventions.

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