A Project Based Learning

Report On

"Air Monitoring control system"

Submitted Towards The

Partial Fulfillment of The Requirements of

B.Tech Robotics and Automation Sem IV

For the Subject

Automatic Control System

Academic Year: 2021-22

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(Deemed to be University)
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Ranked 96th by NIRF
Accredited with "A" grade by NAAC"

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CERTIFICATE

This is to certify that the project entitled Air Monitoring Control System" is a bonafide work carried out by the following students and it is submitted to the Bharati Vidyapeeth Deemed to be University College of Engineering, Pune for the partial fulfillment of the requirement for the of Semester IV Robotics and Automation Bachelor's of Technology Degree for the subject *Automatic Control System* Project Based Learning (PBL) in the of Semester IV Robotics and Automation Engineering .

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DECLARATION

We, hereby declare that the project titled “Air Monitoring Control System” being submitted by us towards the partial fulfillment of Bachelor of Technology , is a project based learning work carried by us is our own work.

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We feel thankful to the college staff for giving me such a big opportunity. We believe we will enroll in more such events in the coming future. We ensure that this project was done by us and is not copied.

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ABSTRACT

A air monitoring control system is a device that automatically detects different type of gases and tells the air quality and also gives us warning if value of gas quality exceeds the threshold value that we have set up.

In the proposed system, a sensors upon senses change in air quality activates its alarm, sends a low voltage signal to all other sensors in the vicinity. This low voltage signal activates the individual relays in the other gas detectors causing them to emit a tone that tells residents that one of the gas detectors senses gas above its threshold value which could be harmful. In this system the transmitter and receiver are installed in a unit and the need for a base is eliminated. The individual gas detectors are equipped with all the electronics required to both send and receive signals. They are battery operated and therefore they require no external connections. They can be installed by a homeowner just as they would a normal gas detector. The proposed design is aiming to have Cost efficient system, Compact design, easily expandable, Simple to install, Replaceable components. The system was tested indoor and outdoor with different distance and with the presence of noise. Standard for Safety of Pollution Alarms, to measure the existances of gases.

CONTENTS

Introduction of the topic

Air is getting polluted because of release of toxic gases by industries, vehicle emissions and increased concentration of harmful gases and particulate matter in the atmosphere. The level of pollution is increasing rapidly due to factors like industries, urbanization, increasing in population, vehicle use which can affect human health. Particulate matter is one of the most important parameter having the significant contribution to the increase in air pollution . This creates a need for measurement and analysis of real-time air quality monitoring so that appropriate decisions can be taken in a timely period. This paper presents a real-time standalone air quality monitoring. The setup will show the air quality on LCD so that we can monitor it very easily. In this Arduino based project, you can monitor the pollution level . The setup will show the air quality in PPM in webpage so that we can monitor it very easily. Air condition is much polluted.

In recent years, car emissions, chemicals from factories, smoke and dust are everywhere. That is the reason why now air condition is much polluted. The effect of air pollution is very bad for our health, especially for place where the air in our body is taken for breathing. In our lungs may cause some diseases, such as asthma, cough, lung disorders .The air pollution cannot be detected by human feelings. The air pollution may contain a lot of dangerous substances, such as LPG gas, carbon monoxide, and methane . Substances in the polluted air are very dangerous. For example, if the carbon monoxide is above 100ppm, it makes human feel dizzy,
nauseous, and within minutes they could die.

This research makes human find out which content of the air is polluted. With module Nod MQ135,MQ 4. This makes the air condition can be monitored every time.

Survey / Review

Ambient air monitoring is an integral part of an effective air quality management system. Reasons to collect such data include to:

- assess the extent of pollution;
- provide air pollution data to the general public in a timely manner;
- support implementation of air quality goals or standards;
- evaluate the effectiveness of emissions control strategies;
- provide information on air quality trends;
- provide data for the evaluation of air quality models; and
- support research (e.g., long-term studies of the health effects of air pollution).

There are different methods to measure any given pollutant. A developer of a monitoring strategy should examine the options to determine which methods are most appropriate, taking into account the main uses of the data, initial investment costs for equipment, operating costs, reliability of systems, and ease of operation.

The locations for monitoring stations depend on the purpose of the monitoring. Most air quality monitoring networks are designed to support human health objectives, and monitoring stations are established in population centers. They may be near busy roads, in city centers, or at locations of particular concern (e.g., a school, hospital, particular emissions sources). Monitoring stations also may be established to determine background pollution levels, away from urban areas and emissions sources.

Systems are needed to ensure that data are of acceptable quality, to record and store the data, and to analyze the data and present results.

Requirements:-

Hardware Requirement:-

1) MQ135 Gas sensor
2) Arduino Uno
3) 16x2 LCD
4) 10K potentiometer
5) 1K ohm resistors
6) 220 ohm resistor
7) Buzzer
8) MQ 4 Methan gas sensor

Software Requirement:-

1) Arduino 1.6.13 Software
2) Embedded C Language

BLOCK DIAGRAM AND WORKING:-

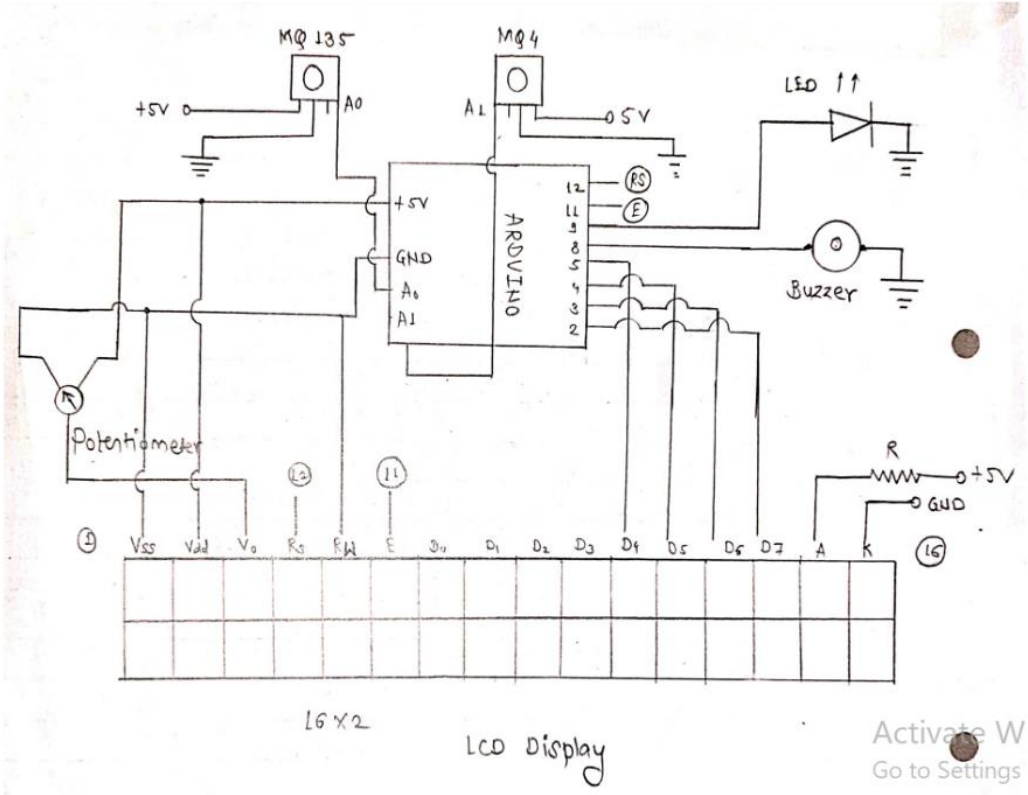
Working:-

Proposed Air Pollution Monitoring System is based on the block diagram. The data of air is recognized by MQ135 gas sensor and MQ4 Methane gas sensor. The MQ135 sensor can sense NH3, NOx, alcohol, Benzene, smoke, CO2. So it is dynamic gas sensored for our Air pollution Monitoring system. When it will be connected to Arduino then it will sense all gases, and it will give the Pollution level in PPM (parts per million). MQ135 gas sensor will give the output in form of voltage levels and we have to convert it into PPM. So for converting the output in PPM, we have used a library for MQ135 gas sensor and MQ4 sensor.

Sensor is giving us value of 90 when there is no gas near it and the air quality safe level is 350 PPM and it should not exceed 1000 PPM. When it will exceed the limit of 1000 PPM, it will cause Headaches, sleepiness and stagnant, stuffy air. If it exceeds beyond 2000 PPM then it will cause increased heart rate and many different diseases. When the value will be less than1000 PPM, then the LCD and webpage will display “Fresh Air”. When the value will increase from 1000 PPM, then the buzzer will start beeping and the LCD and webpage will display “Poor Air, Open Windows”. And when it will increase 2000, the buzzer will keep beeping and give an alert message on smartphone through GSM. The LCD and webpage will display “Danger! Move to fresh Air”. It will contain temperature and humidity so it will possibly show the current temperature and humidity of the air. For temperature we have used LM35 sensor and for humidity SY-HS-220.

According to the model the 4 sensors works as input data, they transmit data for knowing which gas it is,what is the temperature and humidity. LCD and Buzzer are the output devices. LCD shows the data of the gases in ppm (parts per million) and Buzzer is used when ppm crosses above a threshold limit.

Block Diagram



Components:-

1) Arduino UNO:-

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins 6 analog inputs, a 16 MHz quartz crystal, a USB Connection, power jack, an ICSP header and a reset button.

2) MQ135 sensor:-

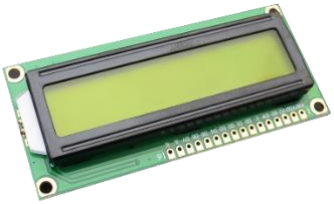
The MQ135 sensor can sense NH3, NOx, alcohol, Benzene, smoke, CO2 and some other gases. It gives the output in form of voltage levels.

3) Buzzer:-

A Buzzer or beeper is an audio signaling device. Whenever the air pollution goes above the threshold level the Buzzer starts beeping indicating Danger.

4) LCD (Liquid Crystal Display):-

This is a basic (16x2) 16 character by 2 line display. Black text on Green background. It is used to indicate the Air and Humidity in PPM.



Applications:-

1) Industrial perimeter monitoring
2) Indoor air quality monitoring.
3) Site selection for reference monitoring stations.
4) Making data available to users.

Advantages:-

1) Easy to Install
2) Updates On mobile phone directly
3) Accurate Pollution monitoring
4) Remote location monitoring

Limitations of conventional systems

The drawbacks of the conventional monitoring instruments are their large size, heavy weight and extraordinary expensiveness. These lead to sparse deployment of the monitoring stations. In order to be effective, the locations of the monitoring stations need careful placement because the air pollution situation in urban areas is highly related to human activities (e.g., construction activities) and location-dependent (e.g., the traffic choke-points have much worse air quality than average) . Changes in urban arrangement, activities or regulation may affect both the species and the concentrations of air pollutants, which require relocating stations or adding new stations. These requirements are typically hard or even impossible to fulfill due to the cost inefficiency in acquisition and maintenance of the monitoring stations. Moreover, the conventional monitoring instruments involve long-term time-consuming average models. The air pollution situation is updated hourly or even daily. Hence, the air pollution maps built by the conventional air pollution monitoring systems are with extremely low spatial and temporal resolutions.

Advantages of using NDT / Superconductivity / Nanotechnology

- **Air pollution control helps to protect the human health:** To every human on earth, health is wealth; health is paramount for the running of our day to day activities, without which we would have to rely on others to live. Air Pollution Scrubber Suppliers come to help protect our health, which is very valuable.
- **Air pollution control helps prevent economic wastes:** With air pollution control, the wastes accrued from dead crops and bad water will be limited or stopped. Some California wine producers complained about how their crops were polluted and customers complained that the wine had begun to taste like sulfur. With the presence of air pollution control, economic slowdowns like this will be prevented or at least managed to the barest minimum.
- **Increased worker productivity:** No matter how strong the immune system is, there are times when it fails, especially when there is excess air pollution. As pollution is controlled, workers can now work for a longer period of time.
- **Helps improve indoor air quality:** Air pollution control helps to secure the quality of the air inside your house.

Brief explanation of applications

A lot of people cannot stand a polluted environment. They try their best to make sure that their environment is safe to live in. They try to reduce the excess release of harmful chemicals into the atmosphere.

Basically, people use it to:

- **Prevent smog dangers:** This is one of the most important reasons why people use the air pollution control. Smog can be very hazardous, which is why air pollution control should be installed at an early stage to prevent smog.
- **Protect their health:** This is part of the reason why most people install the air pollution control. Most of these chemicals could damage the lungs.
- **Improve their indoor air quality:** People use it to improve the air when they are indoors.

Conclusions

The system to monitor the air of environment using Arduino microcontroller, IOT Technology is proposed to improve quality of air. With the use of IOT technology enhances the process of monitoring various aspects of environment such as air quality monitoring issue proposed in this paper. Here, using the MQ135 and MQ4 gas sensor gives the sense of different type of dangerous gas and arduino is the heart of this project. Which control the entire process.If we connect the Wi-Fi module,the whole process to internet and LCD is used for the visual Output.

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List of figures & Link of web pages

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MQ4(Methan Sensor)

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