

Air Pollution Monitoring System Using Arduino Uno

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ABSTRACT: The level of pollution is increasing rapidly thanks to factors like industries, urbanization, increasing population, vehicle use which may affect human health. IoT Based Air Pollution Monitoring System is employed to watch the Air Quality over an online server using the Internet. It'll triggers an alarm when the air quality goes down beyond a particular level, which means when there are sufficient amount of harmful gases present within the air like CO₂, smoke, alcohol, benzene, NH₃ and NO_x. It'll shows the air quality in PPM on the LCD and likewise as well as on the webpage so that air pollution are often monitored very easily. The system uses MQ135 and MQ2 sensors for monitoring Air Quality as it detects the most harmful gases and might measure their amount accurately.

KEYWORDS: Air Pollution, Quality, MQ135 Sensor, IOT, Arduino Uno.

I. INTRODUCTION

In order to observe during this project, we are visiting to make an IOT Based Air Pollution Monitoring within which we are going to monitor the Air Quality over an online/webserver using the internet and can activate an alarm when the air quality goes down beyond a particular level, means when there's sufficient amount of harmful gases are present within the air like smoke particles, CO, benzene and NH₃. It'll show the air elements in PPM on the LCD and yet as on the webpage in order that we are able to monitor it very easily. During this IOT project, you will be able to monitor the pollution level from anywhere using your computer or mobile. Air pollution and harmful gases is that the biggest problem of each and every nation, whether it's developed or developing. Health problems have been growing at a faster rate especially in urban areas of developing countries where industrialization and the growing

number of vehicles results to the release of lot of gaseous pollutants. . IOT Based Air Pollution Monitoring System monitors the Air quality over an internet/web server using the Internet and can trigger an alarm when the air quality goes down beyond a particular strength/threshold level, means when there are sufficient amount of harmful gases present within the air like CO, benzene, NH₃, LPG and NO_x. It will show the air quality in PPM on the LCD and similarly as on the webpage in order that it can monitor it very easily. LPG sensor is added during this system which is employed mostly in houses. The system will show temperature and humidity. The system may be installed anywhere but mostly in industries and houses where gases are mostly to be found and shows an alert message when the system crosses the threshold limit. It is important to supervise air quality and keep it in restraint for a superior future and healthy living for all. Thanks, due to resilience and low-cost Internet of things (IoT) is getting popular day by day. With the Industrialization and with the rise within the vehicles on road the atmospheric conditions have considerably affected. In order to observe during in this project, we are visiting to make an IOT Based Air Pollution Monitoring System within which we'll monitor the Air Quality over the internet using the internet and can activate an alarm when the air quality goes down beyond a particular level, means when there is sufficient amount of harmful gases are present within the air like CO, smoke particles, alcohol, benzene, and NH₃, sulphides. It will show the air elements in PPM on the LCD and as well as on the webpage so that we can monitor it very easily. During this IOT project, you will monitor the pollution level from anywhere using your computer or mobile.



ADVANTAGES:

- Sensors are easily available.
- Simple, compact, easy to handle.
- Sensors have a long life and fewer cost.
- quality of air will be checked indoors as well as outdoor.

1.1 Need for the New System

This project provides a mixture/combination of processes of sensing several gas levels within the air and also the ambient temperature and humidity, thus sensing the quality of the air.

- The presence of the gases and therefore the temperature is displayed a LCD display panel, which continuously shows the real-time output values of the gas sensors, temperature, and humidity sensor.
- To live/measure and display temperature and humidity level of the environment.
- To mix advanced detection technologies to provide an air quality sensing system with advanced capabilities to produce low-cost comprehensive monitoring.
- To display the sensed data in user-friendly format in LCD display module.

1.2 Detailed Problem Definition

Air pollution affects our daily activities and quality of life because of air quality. People must know the extent to which their activities affect air quality. This project proposes an air pollution monitoring system. This model is developed using Arduino Microcontroller. An air pollution monitoring system was designed to watch and analyse air quality in real-time. Within monitoring of air pollution, several researchers worldwide have developed models to watch many of the pollution gases like Sulphur Dioxide (SO₂), Carbon Monoxide (CO), Carbon Dioxide(CO₂), Nitrogen Oxide (NO), Etc.

1.3 Viability of the System

As development of country is increasing its leading to more % of air pollution because of

industrialization, chemical factoring, increased smoke from vehicles, dangerous gases from A.C and home appliances leads to more release of harmful gases and it effects human health.

1.4 Presently Available Systems for the identical.

1. A WIFI-enabled indoor air quality monitoring and system.
2. A low-power real-time air quality monitoring system using LPWAN supported LoRa.
4. A wise sensor system for air quality monitoring and big data collection.

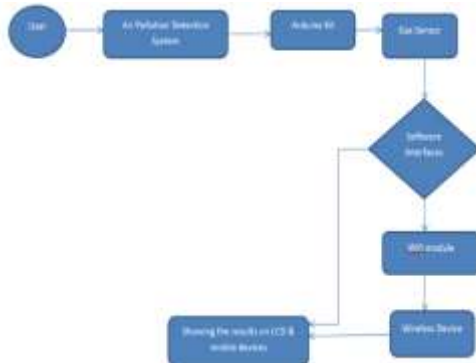
II. LITERATURE SURVEY

The level of pollution has increased with time by a lot of things just like the increase in population, increased vehicle use, industrialization, and urbanization which ends in harmful effects on human wellbeing by directly affecting the health of the population exposed thereto. So as to watch during this project, we are visiting to make an Air Pollution Monitoring System based on Arduino during which we will monitor the Air Quality over a web server using the internet and will activate an alarm when the air quality goes down beyond a specific level, means when there's sufficient amount of harmful gases are present in the air like CO₂, smoke, alcohol, and NH₃. It will show the air elements in PPM on the LCD and as well as on the webpage so that we can monitor it very easily. In this model, we can monitor the pollution level from anywhere using your computer or mobile through WIFI mode. It's necessary to supervise air quality and keep it under control for a superior future and healthy living for all. Due to resilience and low-cost Internet of things (IoT) is getting popular day by day. With Industrialization and with the rise in vehicles on the road the atmospheric conditions have considerably affected.

III. MODELING AND ANALYSIS

List Of Hardware Components

- Arduino Uno.
- Resistor.
- Mq-2 sensor.
- Mq-135 sensor.
- 16*2 LCD Display.
- 20 pins to connect with LCD.
- Jumper Wires. (30 male-female)
- Buzzer
- Power cable/USB cable.
- Potentiometer.
- Breadboard.
- Wifi module ESP8266.



various devices and circuits. It is meant to display 16 letters into 2 rows.



• **Arduino UNO:-**

The Arduino UNO is the best board to get started with electronics and coding. If this is your first experience working with the platform. The UNO is the most used and documented board of the whole Arduino family which also include Nano, Micro, Mega and Robotics boards.



Wifi Module

The ESP8266 WiFi Module is a micro controller with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor.



MQ135 air quality sensor:-

Air quality sensor for detecting a wide range of gases, including Co, NH3, NOx, benzene, smoke particles and CO2. Ideal for use in office or factory. MQ135 gas sensor has high sensitivity to Ammonia, Sulfide and Benzene steam, also sensitive to smoke and other harmful gases that release into the atmosphere.



MQ2 Sensor :

Gas Sensor (MQ2) detects combustible gasses and smoke. The Gas Sensor(MQ2) module is also useful for gas leakage detection (in home and industry). It can detect combustible gas and smoke. The output voltage from the Gas sensor increases when the concentration of gas.



Liquid Crystal Display:-

An LCD (Liquid Crystal Display) screen is an electronic display module and has a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in

IV. WORKING

Firstly, we will connect the MQ135 sensor with the Arduino. Connect the VCC and therefore the ground pin of the sensor to the 5V and ground of the Arduino and then the Analog pin of the sensor to the A0 of the Arduino Uno/Microcontroller. Connect a buzzer to pin 13 of the digital side of Arduino which can start to beep when the condition becomes true. The sensor will detect the Pollution present in the air. When the Pollution will detect it will check by the Arduino uno. The it will display the Range of Air Pollution Available in the Air. Then it will display the range on the LCD(16*2).

V. CONCLUSION

In this paper we have tried to solve the air pollution problems the system to monitor the air of environment using Arduinio microcontroller, IOT Technology is proposed to improve quality of air. With the use of IOT technology enhances the process of monitoring various aspects the environment of such as air quality monitoring issue proposed in this paper.

Future Prospects

- Use more sensors so that they can be used to know % of each gas present in the atmosphere.
- Design a website and you can upload data of these sensors over the internet.

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