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## AIR POLLUTION MONITORING SYSTEM (IOT MOBAIR)

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**Abstract**— Nowadays air pollution has turned out to be one of the significant issues because of increment in the quantity of vehicles and during the time spent industrialization and urbanization. This increase in pollution has negative effects for prosperity. This project demonstrates how to design and implement an air pollution detecting system. The invention here is a practical application of the Internet of Things concept. This extensive effort is an investigation into the consumption possibilities of this breakthrough in a world where natural well-being is becoming a true threat. The project is realised using an ESP32 microcontroller board. In this project I am going to make an IoT based Air Pollution Detection Monitoring System in which I will monitor the Air Quality over a blynk server and gives a red light when the air quality goes down a certain level means when there is amount of harmful gases is present in the air like CO<sub>2</sub>. It will show the air quality in PPM (Parts Per Million).

**Keywords:** ESP32 Microcontroller, Embedded systems, MQ2, MQ7, MQ135 Gas Sensors

### I. INTRODUCTION

Air pollution is the most pressing issue confronting every country, whether developed or developing. Medical problems have been growing at a faster rate, particularly in urban areas of agricultural countries, where industrialization and an increase in the number of automobiles has resulted in the entrance of a package of vaporous poisons. Contamination's harmful effects include minor irritations like sore throats, eyes, and noses, as well as more serious difficulties like bronchitis, heart infections, pneumonia, lung, and aggravated asthma. According to an assessment, air pollution causes 50,000 to 100,000 unanticipated losses per year in the United States alone.

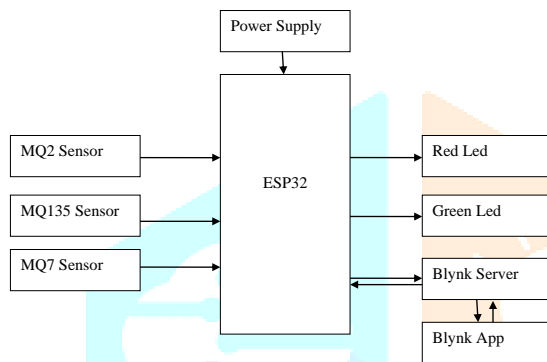
While the number in the EU is roughly 300,000, there are over 3,000,000 worldwide. The IOT-based Air Pollution Monitoring System monitors air quality over the Internet and sends out a warning when the air quality drops below a certain threshold, which means there are enough harmful gases present everywhere around, such as CO<sub>2</sub>, smoke, liquor, benzene, NH<sub>3</sub>, LPG, and NO<sub>x</sub>. It will display the air quality in PPM on the LCD, much like a page, so it can be viewed without difficulty. This framework, which is commonly used in homes, includes an LPG sensor. In the framework, temperature and mugginess will be displayed. The framework can be installed anywhere, but it is most commonly seen in businesses and homes where gases are present, and it sends out an alarm message when the framework exceeds its boundary limit.

### II. PROPOSED SYSTEM

The paper aims at designing an air pollution monitoring system which can be installed in a specific locality and to enhance the system from the previously developed systems beating the earlier disadvantages by developing an android app available for the public. This

app can be used by anyone to get in live updates about the pollution in their region. It uses ESP32 Microcontroller with individual gas sensors like carbon monoxide, ammonia along with particulate matter, humidity, and smoke which measures the concentration of each gas separately. The collected data is uploaded to the cloud using thing speak platform at regular time intervals. Pictorial or graphical representation of values can be shown in Thing speak The users can install an android application through which they get the recent updates and graphical content up to date. Then certain time control is assigned based on the standard level of each gas measured and the result can be viewed in android application. The architecture of air pollution monitoring and awareness creation system. The concentration level of each gas can be viewed both as a graph and in numerical format. Based on these values the air quality index value is calculated and the nature of the air quality in that area is determined which is also displayed through the app. Along with this, the health effects for the corresponding air quality is displayed to create awareness among the public.

### III. BLOCK DIAGRAM



**Fig: block diagram of Proposed system**

**ESP32 Microcontroller** ESP8266 grabbed the embedded IoT world by storm a few years ago. You can acquire a programmable, Wifi-enabled microcontroller that can monitor and control objects from anywhere in the globe for less than \$3. The Espressif ESP32 is a wonderful super-charged upgrade (the semiconductor company behind the ESP8266). It is the successor to the ESP8266 and supports not only WiFi but also Bluetooth 4.0 (BLE/Bluetooth Smart), making it suitable for nearly any IoT project.

**A. MQ7 Sensor** The MQ-7 sensor will be used to detect carbon monoxide. The effects of CO are detectable by this sensor. Carbon monoxide (CO) is a very toxic gas that is odourless, colourless, and tasteless, making it impossible to detect. Except for the fact that they would start to feel terrible, a person would have no idea they were breathing in CO. Headache, nausea, vomiting, dizziness, exhaustion, and a sensation of weakness are the most typical symptoms of CO poisoning. Confusion, disorientation, visual disturbance, syncope, and seizures are all neurological symptoms.

**B. MQ2 Sensor** MQ2 Gas Sensor Module LPG, Propane, and Hydrogen, as well as Methane and other combustible steam, can all be detected by the MQ2 gas sensor. It is low-cost and suitable for a wide range of applications. Combustible gas and smoke are detected by the sensor. 5 volts is used to power the smoke sensor. A smoke sensor's output voltage shows the presence of smoke. More smoke equals more output. The sensitivity can be adjusted with a potentiometer. The sensor utilised when the air is clean is SnO<sub>2</sub>, which has a low conductivity. When there is smoke, however, the sensor produces an analogue resistive output based on the amount of smoke present.

**C. MQ135 Sensor** Ammonia, nitrogen, oxygen, alcohols, aromatic chemicals, sulphide, and smoke are all detected by the MQ-135 gas sensor. The chip MQ-3 gas sensor's boost converter is PT1301. This gas sensor's operating voltage ranges from 2.5V to 5.0V. As a gas sensing material, the MQ-3 gas sensor has a lower conductivity to purify the air. Polluting gases can be found in the atmosphere, however the conductivity of a gas sensor increases as the concentration of polluting gas rises. Smoke, benzene, steam, and other dangerous gases can be detected using the MQ-135 gas sensor. It has the ability to detect a variety of dangerous gases.

### Operation:

The architecture of the suggested system is depicted in the diagram above. The ESP32 is in charge of the entire system. If WSN is used in conjunction with the Internet of Things, the information shared will be more useful (IOT). Sensors, software, and embedded electronics make up the Internet of Things. The data acquired in a small region can be transported to any distance where it can be seen, and if necessary, further regulating action can be taken. The data from the region where the sensors are deployed is collected by the WSN-based air monitoring system and shown on a computer screen. Data from a PC can be sent to any Internet-connected terminal. As a result, data can be transmitted over vast distances utilising IOT. The monitoring is limited to a specific area, but the data can be sent to any control station. As a result, the air pollution levels on campus and in cities may be monitored using IOT, and necessary advisories can be given if necessary.

### IV. CONCLUSION

The use of IOT technology improves the monitoring of numerous aspects of the environment, such as the air quality monitoring issue suggested in this project. The MQ7, MQ135 and MQ2 sensors are used to detect several types of harmful gases, and the ESP32 is at the heart of this project.

### V. FUTURE SCOPE

The proposed model will be deployed in real time in the near future. Maintenance of equipment in various weather situations, effective data transfer, and other issues must be solved, and this system can be improved by using AIR filters for preventative purposes.

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