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## **Air and Sound Pollution Monitoring System**

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### **ABSTRACT:**

In infrastructure and industrial plants the rapid growth creating environmental issues like pollution (Air, Water, Noise), climate change, malfunctioning and has greatly consequence for the requirement of an, operationally adaptable, efficient, cheap and smart monitoring systems. In this context where combination of many challenges of computer science, wireless communication and electronics; the Smart Sensor Networks are an emerging field of research. In this paper a solution to monitor the air and noise pollution levels in industrial environment or by using wireless arduino computing system a particular area of interest is proposed. The technology like Internet of Things (IoT) is included in the form of solution which is outcome of merged field of computer science and electronics.

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### **1. INTRODUCTION**

To control and monitor of different activities focused by Present innovations in technology. To reach the human needs these are increasingly emerging. Most of this technology is focused on efficient monitoring and controlling different activities. To monitor and assess the conditions in case of exceeding the prescribed level of parameters (e.g., noise, CO and radiation levels) an efficient environmental monitoring system is needed. In an environment when an object equipped with sensor devices, then in this case microcontroller and various software applications becomes a self-defending Selfmonitoring and self-controlling environment and it is also called as smart environment. In such environment when LED alerts automatically or some event occurs the alarm. Smart Environmental Monitoring System monitor and control the ecological changes on animals, plants and human beings on the basis effects due to environmental changes. By using arduino intelligence into the environment makes the environment interactive with other objectives, this is one of the application that smart environment targets Human needs demands different types of monitoring systems these are depends on the type of data gathered by the sensor devices. Event Detection based and Spatial Process Estimation are the two categories to which applications are classified. Initially the sensor devices are deployed in environment to detect the parameters (e.g., noise, CO and radiation levels etc.

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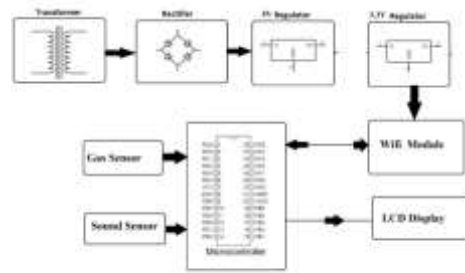
### **2. Methodology**

z collected data is then processed and analyzed in real-time, leveraging cloud-based analytics platforms. Users can access the monitoring system through web or mobile applications, which provide visualizations, alerts, and historical data.

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### **3. Block Diagram :**

Proposed system can detect the harmful gases and Excessive noise. This system is new concept which can detect both Air and Sound pollution. The sensor we are using here is MQ135 as air and Microphone as sound sensor. Sensor MQ135 is air quality sensor which is used to detect the harmful gases like NH<sub>3</sub>, CO, CO<sub>2</sub> and SO<sub>2</sub>. The MQ135 sensor is sense the condition and gives the signal to the system. The air and sound pollution monitoring system consist of Gas sensor (MQ135), Sound sensor, Arduino microcontroller, ESP8266 Wi-Fi module and cloud etc. The block diagram for the working of the Sound and air pollution monitoring system is as following:



## 4. Components Analysis:

### 4.1 Arduino controller:

Arduino Uno R3 microcontroller. It is the most flexible hardware platform used based on ATmega328P which can be programmed according to the function where it is to be used. It has 6 analog inputs, 14 digital input/output pins(6 pins of these can be used as PWM outputs) , a USB connection, a 16 MHz quartz crystal, SPI, serial interface, a reset button, a power jack and an ICSP header.



It is the primary component of the framework. In addition, it is an open source microcontroller device with easily accessible software/hardware platform and is compatible with many sensors available. Everything needed for its working is present on the board; we only require a USB cable to directly connect it to the computer or give power using battery source or AC to DC adapter to get started.

### 4.2 Gas Sensor:

Sensitive material of MQ135 gas sensor is SnO<sub>2</sub>, which has lower conductivity in clean air. When the target combustible gas exist, the sensor's conductivity is higher along with the gas concentration rising. MQ135 gas sensor has high sensitivity to A Sulfide and Benze steam, also sensitive to smoke and other harmful gases. It is with low cost.



Specification of MQ135

Operating Voltage: 5V DC

- Type: Analog • & Digital.

Pin:1-O/P,2-GND,3-Vcc.

- Detecting Type: Air Quality
- Sensitivity to Ammonia, Sulphide and Benzene steam.
- Detecting Range: 100-1000ppm.

#### 4.3. Sound Sensor:

The sound sensor module provides an easy way to detect sound and is generally used for detecting sound intensity. This module can be used for security, switch, and monitoring applications. Its accuracy can be easily adjusted for the convenience of usage. It uses a microphone which supplies the input to an amplifier, peak detector and buffer. When the sensor detects a sound, it processes an output signal voltage which is sent to a microcontroller then performs necessary processing



Specification of Sound Sensor: Operating voltage 3.3V-5V

- Output model: digital switch outputs (0 and 1, high or low level).
- Voltage Gain 26dB.
- Microphone Impedance 2.2k $\Omega$ .
- Microphone Frequency 16.20 kHz.

#### 4.4. ESP8266 Wi-Fi model:

ESP8266 is an impressive, low cost Wi-Fi module suitable for adding Wi-Fi functionality to an existing microcontroller project via a UART serial connection. The module can even be reprogrammed to act as a standalone Wi-Fi connected device.



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#### 4. RESULT:



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#### 5. CONCLUSION :

Thus the article explains the basic structure and system design for IOT based air and sound pollution monitoring system. The article also explains the basic blocks and components used in this system. It's a complete case study for the proposed system design. The system is very much helpful for real time air and sound pollution monitoring. The System can be applied at remote areas and can be used to control pollution. The proposed system is cheaper in cost and smaller in size and it can be applied in industries as well as public sectors.

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#### 6. REFERENCES

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- [2] Vipul Ranjan Kaushik et al., "IOT based energy meter billing and monitoring system -A case study.