

ABSTRACT:

This paper presents an IoT-based system for real-time monitoring and control of atmospheric pollution in traffic environments. It uses low-cost gas sensors integrated with a microcontroller and communication module to detect pollutants like CO, NO₂, and PM2.5. The system transmits data to a central server, enabling alerts and traffic management strategies when pollution exceeds safe levels. Key aspects include sensor calibration, data processing, and communication protocols. Challenges and future enhancements, such as integrating meteorological data and predictive modeling, are discussed. The system offers a cost-effective, scalable solution for improving urban air quality.

PROBLEM STATEMENT:

- Rapid urbanization and increasing vehicular traffic.
- Significant rise in atmospheric pollution.
- Severe health risks and contribution to global climate change.

INTRODUCTION:

- Rapid urbanization and increasing vehicular traffic lead to rising atmospheric pollution.
- Harmful gases like CO, NO₂, and CO₂ contribute to severe health risks and climate change.

LITERATURE TABLE:

Author	Paper published year	Journal or conference name	Proposed method	Parameter details	Advantage
Singh & Gupta	2021	IEEE Access	IOT-based monitoring system with sensors for detecting air pollutants and controlling traffic signals.	-CO,CO2,,SO2 sensors -Traffic signal control -Wireless communication(Wi-Fi,Zigbee).	-Real-time pollutant monitoring -Improved traffic flow -Low-cost solution
Kumat et al.	2020	IEEE international conference	IOT system to monitor and control pollution in high-traffic zones,integrating smart devices for air quality control.	Integration of traffic control and pollution sensors,cloud computing for data analysis and forecasting.	Efficient management of traffic-induced pollution,minimizes the impact of harmful gases,helps in policy formation.

EXISTING SYSTEM:

The leverage sensors to detect pollutants ,transmit data via IOT platforms and utilize mobile apps or web dashboards for real-time monitoring and analysis.

1. Sensor Nodes
2. IoT Gateway
3. Cloud Server
4. Mobile App
5. Control Center

PROPOSED SYSTEM:

Leverage sensors, a microcontroller, data transmission, and a cloud platform for real-time monitoring and analysis, potentially triggering alerts based on predefined thresholds.

1. Predictive analysis
2. Traffic management
3. Alert system
4. Data Visualization

ADVANTAGES OF PROPOSED SYSTEM:

- Real-Time Monitoring
- Automated control of traffic flow
- Improved Public Health and Safety
- Public Awareness

HARDWARE REQUIREMENTS:

1. Gas Sensors:

- MQ Series(e.g., MQ-7 for CO, MQ-135 for air quality, MQ-2 for Smoke)

2. Microcontroller/Development Board:

- Arduino(e.g., Arduino Uno, Arduino Nano).

3. Display:

- LCD(16x2 or 20x4) or OLED display.

4. Wi-Fi/Bluetooth Module:

- ESP8266(Wi-Fi module) or ESP32(Wi-Fi and Bluetooth).

SOFTWARE REQUIREMENTS:

1. Programming Languages:

- C/C++ for microcontroller programming(e.g., for Arduino).
- Python (if using Raspberry Pi or for backend development).

2. IOT Communication Protocols:

- MQTT or HTTP
- WebSocket

3. Cloud Platform/Server:

- AWS IoT, Microsoft Azure, Google cloud IoT.
- Custom Server Setup(Node.js).