

Vehicle Pollution Monitoring

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Abstract: *With the rapid growth in the number of vehicles on roads, vehicular emissions have become a significant contributor to air pollution, posing serious threats to environmental sustainability and public health. Traditional pollution monitoring methods, which rely on stationary monitoring stations or periodic manual inspections, are often limited in scope, lack real-time capability, and are not scalable for dynamic urban environments. This paper presents the design and implementation of an IoT-based Vehicle Pollution Monitoring System that enables real-time detection, monitoring, and reporting of harmful exhaust gases such as Carbon Monoxide (CO), Nitrogen Oxides (NOx), and Hydrocarbons (HC). The system employs gas sensors (MQ-7, MQ-135, MQ-136), a microcontroller (ESP32 or Arduino UNO), and wireless communication modules (Wi-Fi, GSM) to collect emission data from vehicles and transmit it to a cloud-based platform for processing, visualization, and storage. A mobile and web-based interface provides users and authorities with real-time access to emission data, alerts for threshold violations, and historical analysis for regulatory compliance and environmental assessment. The proposed system enhances pollution control efforts by providing continuous, scalable, and cost-effective monitoring, supporting smart city initiatives, and contributing to proactive environmental management.*

Keywords: Vehicle Emissions, IoT, Air Pollution Monitoring, Gas Sensors, Real-Time Monitoring

