Real-Time Monitoring Of AQI In Underground Mines And Remote Intervention Of Ventilations System Using IOT Technology

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• Abstract

Air pollution is a growing concern especially in the mining industry. Toxic gases and pollutants pose serious health risks to miners .This project focuses on designing a real time air quality monitoring (AQI) system for underground mines utilizing IOT technology .The system ensure workers safety by continuously monitoring pollutants And controlling ventilation remotely . The aim is to prevent hazardous incidents and optimize air quality.

• Background

Insert your text Here Underground mines face significant challenges due to the accumulation of toxic gases like methane, CO2, and other pollutants. Traditional air quality monitoring methods are ineffective, relying on manual sampling and laboratory analysis. These conventional methods lack real-time monitoring capabilities, making it challenging to respond promptly to changing air quality conditions.
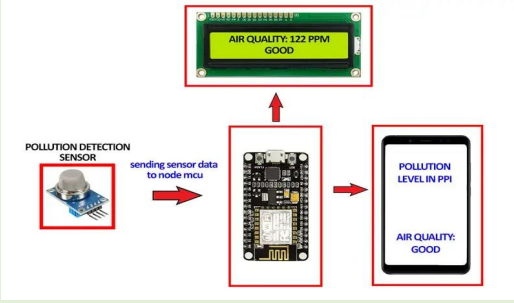

• Methods

Sensor Deployment: Install IoT-enabled sensors to detect AQI parameters such as CO2, methane, oxygen levels, and humidity.

Data Transmission: Use wireless technology (e.g., LoRa or Wi-Fi) to transmit data to a centralized monitoring system.

Data Analysis: Employ cloud platforms to process and visualize the AQI data.

Remote Control: Enable ventilation systems to be controlled remotely via IoT devices or mobile applications.
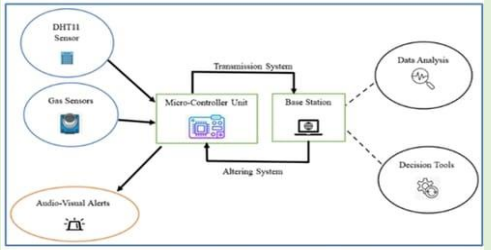
• Future Perspectives

Expansion to monitor additional environmental parameters like temperature and noise levels.
Integration with AI models for predictive maintenance and hazard detection . Adaptation for use in other hazardous environments like tunnels and chemical plants.

• Impact on Society

This technology enhances workplace safety, reduces fatalities in underground mines, and promotes sustainable mining practices. It also demonstrates the potential of IoT to address critical industrial challenges.

• Results

Real-time AQI Monitoring Successfully implemented a system for real-time monitoring of Air Quality Index (AQI).Enhanced Miner Safety: Improved safety for miners through immediate intervention Optimized Ventilation Systems: Increased energy efficiency of ventilation systems by optimizing usage based on real-time air quality data.

Conclusion

Insert This demonstrates the effective use of IOT technology for real-time monitoring of air quality in underground mines, ensuring worker safety. It enables remote control of ventilation systems, reducing risks from toxic gases.

To know more

GitHub link:
Video link:

insert your QR code here