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| **Abstract:** |  |
| Abstract—This paper introduces an IoT-based system to enhance safety in coal mining operations. The system addresses hazardous conditions, such as gas leaks, water accumulation, extreme temperatures, and humidity by monitoring such critical parameters in real-time. Sensors integrated with a microcontroller measure the gas levels, water levels, temperature, and humidity. The data collected is analyzed to identify potential hazards and trigger alerts. Traditional gas detection is augmented with a buzzer-based warning system. Laser-detection sensors ensure adequate lighting. To mitigate fire risks, email notifications are sent to designated personnel. Temperature readings and vibration sensor data are visualized on both a serial monitor and a web-based platform. This IoT-based solution significantly improves the safety and working conditions of coal mine workers. | |