Safety-Device-For-Mining-Workers-Using-IoT

Project Description:

The Miners Safety Monitoring System is an advanced IoT-based embedded solution designed to ensure the safety of mining workers by continuously monitoring critical environmental conditions and vital signs. This system utilizes a suite of sensors and modules to detect gas concentration, pulse rate, temperature, and humidity levels. The collected data is displayed on an LCD screen and transmitted to a remote monitoring application via the Blynk platform, enabling real-time alerts and data logging for prompt intervention in case of hazardous conditions.

Features:

1. Gas Concentration Monitoring:

- Sensor: MQ-4 Gas Sensor
- Function: Detects methane gas levels in the mining environment and activates a buzzer alarm when concentrations exceed safe thresholds.

2. Pulse Rate Monitoring:

- Sensor: Pulse Sensor
- Function: Continuously tracks the miner's pulse rate and displays the data on an LCD screen, providing immediate feedback on the miner's health status.

3. Temperature and Humidity Monitoring:

- Sensor: DHT11 Sensor
- Function: Monitors ambient temperature and humidity levels, displays them on the LCD, and sends alerts through Blynk if temperature levels surpass the set limit.

4. Remote Monitoring:

- Platform: Blynk
- Function: Facilitates real-time data visualization and alert notifications on a mobile device, allowing for immediate action in case of anomalies.

5. LCD Display:

- Display: LiquidCrystal I2C (16x2) LCD Display
- Function: Provides a real-time, on-site visual indication of the monitored parameters, including gas concentration, pulse rate, temperature, and humidity.

Hardware Requirements:

- NodeMCU (ESP8266)
- MQ-4 Gas Sensor
- Pulse Sensor
- DHT11 Temperature and Humidity Sensor
- 16-channel Analog Multiplexer (MUX)
- LiquidCrystal I2C (16x2) LCD Display
- Buzzer
- Connecting Wires and Breadboard

Software Requirements:

- Arduino IDE
- Blynk Library
- PulseSensorPlayground Library
- DHT Sensor Library
- LiquidCrystal I2C Library

This project provides a comprehensive safety solution tailored for the mining industry, utilizing IoT technology to enhance monitoring capabilities and ensure the well-being of workers in potentially hazardous environments.