IoT-Based Gas Leakage Detection System

January 2024 – March 2024
Role: Developer & System Integrator

Problem Statement:

Gas leaks pose a critical threat to both residential and industrial environments. Traditional gas detection methods are manual, delayed, and often hazardous. This project leverages IoT technologies to provide real-time alerts, enabling proactive action and preventing disasters.

Project Highlights:

Key features:

- MQ2/MQ135 Sensors: Detect presence of combustible and toxic gases.
- NodeMCU ESP8266: Wireless microcontroller for cloud connectivity.
- GSM Module (SIM800L): Sends SMS alerts and live updates during critical leaks.
- Mobile Notifications: Remote users receive real-time alerts.
- Buzzer & LED System: On-site audible and visual alarms for immediate awareness.

My Contributions:

- Integrated MQ2 & MQ135 gas sensors with NodeMCU.
- Developed Arduino-based logic to monitor gas thresholds and trigger alerts.
- Configured GSM SIM800L module to reliably send SMS alerts.
- Designed and soldered a compact, stable hardware layout.
- Calibrated sensor accuracy for indoor gas detection scenarios.

Technologies Used:

MQ2 Sensor | MQ135 Sensor | NodeMCU ESP8266

GSM SIM800L | Arduino IDE | Buzzer | LED | IoT

Challenges & Learnings:

- Fine-tuned sensor calibration to minimize false positives.
- Optimized signal strength handling for SMS delivery in low-coverage areas.
- Understood hardware-software integration with real-time responsiveness.

Outcome:

A compact and responsive IoT gas detection system capable of providing instant alerts locally and remotely, enhancing safety in vulnerable environments.