Department of Electrical, Electronics, and Communication Engineering
GITAM School of Technology,
GITAM (Deemed to be University), Bengaluru, India

<u>**Extended Abstract PROJ3999**</u>

Title: Real Time Monitoring of AQI In Underground Mines and Remote Intervention of Ventilation System Using IOT Technology
Project Supervisor: Dr. Kshitij
Cluster Name (AI/ML, VLSI, Comm., CSP, Power Systems): IOT
Project Coordinator: Dr. Arun Kumar
(If Interdisciplinary, share details)

Mini Project (PROJ2999) Outcome:
- Optimized Resource Use: Efficient water and fertilizer application based on real-time pH and moisture data, reducing waste and costs
- Improved soil conditions tailored to specific crop needs, leading to healthier plants and higher productivity.
- Reduced water usage and minimized chemical runoff, promoting eco-friendly farming practices.
- Real-time insights enable precise decision-making and long-term soil health monitoring for sustainable agriculture.

Extended Project Abstract

Nowadays, the standing expansion in air quality, temperature, and mugginess end up being a disturbing issue, particularly in the mining business. The aim of this research is to show a mine air quality contamination checking framework that is equipped for measures different sorts of poisons, and its level that proposed through ongoing utilizing the Internet of Things (IoT). This framework will be furnished with an organization of sensors like the gas sensor, temperature, and humidity sensor and the information from these sensors will be communicated utilizing Arduino as a microcontroller, if there is any indication of an inside threat a notice ready will be shipped off both the digger and the security official by a signal and the remote organization. In this research, the proposed Arduino framework upgrades mine environmental security by rapidly foreseeing mine air quality. When air get mixed with harmful gases and substances it is called air pollution. The major pollutants of air are gases such as ammonia, carbon monoxide, Sulphur dioxide, nitrous oxides, methane etc. The sources of pollutants are industrial emission, hazardous emissions form vehicles, burning of fossil fuels etc. Pollutant air can cause severe health effects such as heart disease, lungs cancer, respiratory infections etc. The system not only monitors air quality but also controls the ventilation system to ensure that air quality is continuously maintained at safe levels. If hazardous gases or oxygen levels drop below safe thresholds, the ventilation system will be automatically adjusted, increasing airflow or changing direction to bring in fresh air, ensuring that miners can work safely without the risk of contamination. By enabling real-time monitoring and remote control of the ventilation system, the IoT-based approach optimizes energy consumption and improves operational efficiency . By leveraging real-time data, predictive analytics, and automated control systems, this project aims to significantly reduce the risks posed by polluted air and ensure the long-term health and safety of mining personnel.

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Extended Project Objectives

► This project is aimed to develop an IOT based application to deal with air pollution

► With the help of sensors such as MQ7 various air parameters are sensed and transmitted

►ESP32 development board plays important role in this project

► The prototype connects with Wi-Fi and uploads all air parameters to centralized server

Ghent chart for Extended Project PROJ3999-

Gantt Chart for Real-time Monitoring of AQI Project
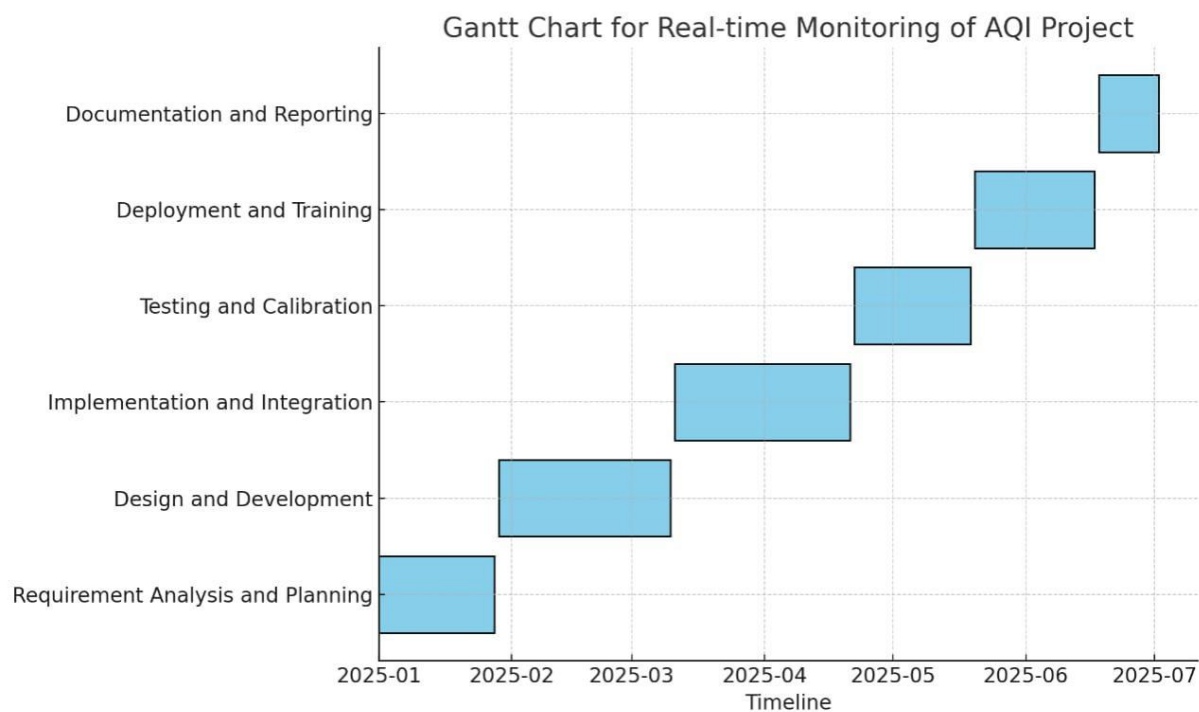
Suggest 2 IEEE Conference targets-

1. IEEE International Conference on Industrial Internet (ICII).
2. IEEE International Conference on Smart Computing (SMARTCOMP).

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DR.KSHITIJ

Sign with date