**Problem Statement-2**

**Title of Problem Statement:** Indigenous Development of Multigas Detector for underground coal mining for continuous monitoring.

**Issues:**

Underground coal mining poses significant safety challenges due to the presence of hazardous gases such as methane, carbon monoxide, SOx, NOx and hydrogen sulfide. Traditional gas detection systems are often expensive and may not be feasible for widespread use in resource-constrained settings, leading to increased risk of explosions, fires, and health issues for miners. Effective gas monitoring is crucial for ensuring the safety of mining operations, providing early detection and alert systems that can prevent catastrophic incidents. Currently, the global market offers a range of multigas detectors, which, while effective, are often prohibitively expensive for many mining operations, especially in resource-constrained environments. Therefore, the development of an indigenous, multigas detector becomes vital. By producing a cost-effective solution locally, we can ensure broader adoption and enhanced safety standards across the mining industry, aligning with the Atmanirbhar Bharat initiative to reduce dependency on expensive imports and foster domestic innovation.

**Expected Outcomes:**

The expected outcome for the indigenous development of a multigas detector for underground coal mining focuses on creating a highly accurate, cost-effective device that promotes the principles of Atmanirbhar Bharat (self-reliant India). By utilizing locally sourced materials and expertise, the project aims to reduce production costs while maintaining high standards of accuracy and reliability. This approach not only ensures affordability and accessibility for resource-constrained mining operations but also fosters local innovation and reduces reliance on expensive imported technologies. The development process will involve rigorous testing and calibration to ensure the detector's precision in identifying hazardous gases such as methane, carbon monoxide, Carbon Dioxide, Hydrogen SOx, NOx and Hydrogen Sulfide as per statute. By prioritizing indigenous development, this initiative will enhance safety measures in coal mines, promote self-sufficiency, and contribute to the broader goal of making India a global leader in advanced, affordable technology solutions.

* Develop a multigas detector indigenously using affordable and readily available components.
* Multi-gas Detection Capability: Enable the detection of multiple hazardous gases such as methane, carbon monoxide, and hydrogen sulfide simultaneously.
* Real-time Monitoring: Implement continuous real-time monitoring with instant alerts to detect gas concentrations and potential hazards promptly.
* User-friendly Interface: Create an easy-to-use interface for miners, ensuring clear and accessible readings and alerts.
* Robust and Durable Construction and Flame proof: Design the detector to withstand the harsh conditions of underground coal mines, ensuring longevity, reliability and flameproof for underground mine environment.
* Local Manufacturing, Maintenance & Caliberation: Facilitate local manufacturing and easy maintenance to support indigenous development and reduce dependency on external resources.

**Mentors:**

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