ELECTRICAL ENGINEERING DEPARTMENT
COLLEGE OF ENGINEERING AND SCIENCES
FINAL YEAR PROJECT

SUPERVISOR:
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PROJECT:
Coal Safe Helmet: A Life-Saving Helmet with Toxic for Coal Miners

GROUP MEMBERS:
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ABSTRACT

The coal mining industry is very important for the nation's economy and the need for coal is very high nowadays because it plays an important role in the generation of electricity, carbon fibers, cement production, commercial heating, and home goods. Industrial safety is a critical concern, especially in the Coal mining industry. Our project agenda is to use modern technology like IoT through which we can observe the Toxic gasses, pulse rate, temperature, and humidity present in mine. This device represents a critical step towards enhancing industrial safety standards in the coal mining industry which plays a crucial role in enhancing the economy of the country. This proposed project is an efficient and affordable, IoT-based smart system for monitoring the environment present in mine.

INTRODUCTION

Mining is a very crucial part of the growth of any country because it produces opportunities for many other sectors. Working on the surface has different safety and health issues. This is the fact that security and safety are among the essential features of any mining sector. Every mining industry needs to follow basic safety measures to avoid any accidental situations. Tragic incidents are increasing, because of foreign corporations getting involved in coal extraction. The economy of mining is demonstrated by the opportunities it generates for numerous industries worldwide Coal miners can reduce these dangers and perhaps save lives by wearing a life-saving helmet equipped with sensors of toxic gas detectors and alerting communication system.

PROBLEM STATEMENT

Several challenges faced by the coal underground coal miner during the coal mining, leading to safety and health. These situations can lead to long-lasting health impacts like Chronic Obstructive pulmonary disease (COPD) and Coal Worker's pneumoconiosis (CWP) diseases which lead to lungs cancer and can cause of death of an employee. The main problems that need to be resolved are the Detection of Hazardous Gases, such as Butane, Methane, Liquefied Petroleum Gas (LPG), Carbon Monoxide, and Smoke. Detection of environmental factors such as Temperature and Humidity and 2 measuring of Health features like Pulse-Rate Detection and when the situation gets worse an Alert System is installed for altering the miner when the gas is detected.

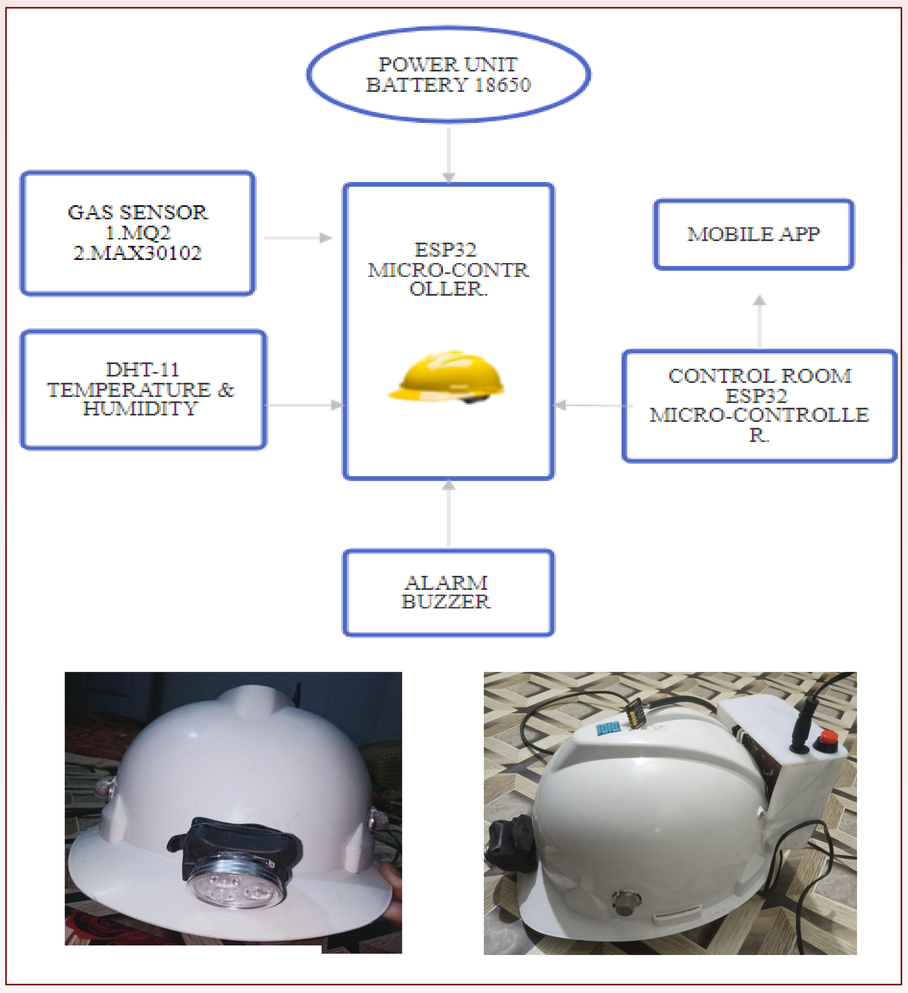
PROJECT COMPONENTS

Hardware
- ❖ESP32 Micro Controller
- ❖ Power Battery
- ❖Helmet

Sensors
- ❖ MAX30102 Sensor
- ❖MQ-2 Sensor
- ❖MQ-135 Sensor
- ❖DHT-11 Sensor

Software
- ❖ C++

BLOCK DIAGRAM



IMPACT & RESULTS (SDGS, CEPS)

❖**Depth of Knowledge:**
The concept of the Coal Safe Helmet is applied to observe the toxic gases, real-time parameters such as temperature, humidity, heart rate, and gas status underneath the mine and to check the health of the worker using electronic gadgets technology.

❖**Depth of analysis requirements:**
In, workers can't measure the gases, heart rate, temperature and humidity manually. With the help of Electronics, it is possible now

❖**Familiarity of issues:**
For real-time testing and monitoring, the project was designed to fight the issues faced in underground mining.

SDG GOAL 3, 8 & 9