SMART MINING HELMET USING "IOT"

ACTS CDAC, Pune

PG- DIOT

GUIDE

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IDENTIFICATION OF THE PROBLEM

- The goal of creating an IoT-enabled smart mining helmet is to improve miner safety by tracking locations and monitoring environmental parameters in real-time.
- It tackles issues including data management in mining operations, communication constraints, and safety threats. Through the integration of sensors, communication technologies, and data analytics.
- The helmet guarantees prompt emergency responses, enhances productivity, and reduces health hazards for miners.

PROBLEM STATEMENT

Creating a method that effectively integrates sensors and communication technologies to improve miner safety, expedite operations, and reduce hazards in the mining sector is required to create a smart mining helmet using IoT.

PURPOSE OUTCOME

The outcome aims to provide real-time monitoring of environmental conditions and health metrics.

while a seamless communication and emergency response, ultimately reducing accidents and optimizing productivity in mining environments.

ABSTRACT

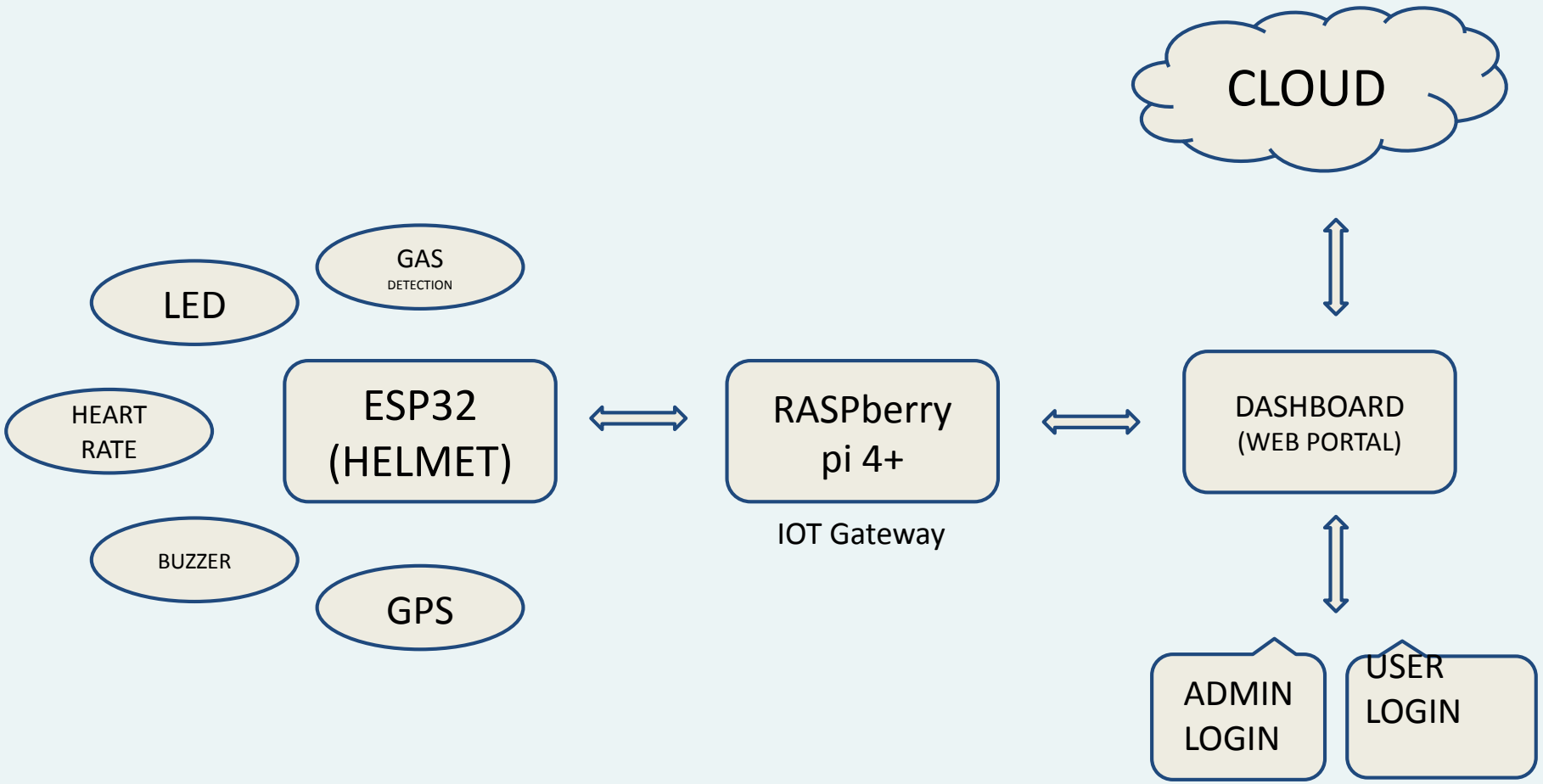
This project focuses on the development of a smart mining helmet using IoT, integrating an ESP32 microcontroller and a Raspberry Pi gateway for sensor integration and data processing.

The helmet incorporates sensors for real-time monitoring of environmental conditions (including gas detection), health metrics (such as heart rate), and location tracking (via GPS).

Additionally, a buzzer system is included for emergency alert.

This comprehensive system aims to significantly enhance safety and operational efficiency in mining environments.

BLOCK DIAGRAM



CONNECTIVITY / PROTOCOLS

MQTT protocol enables real-time transmission of sensor data from smart mining devices for monitoring environmental conditions, facilitating remote equipment control, and issuing emergency alerts, thereby enhancing safety and productivity in mining operations.

HARDWARE AND SOFTWARE TOOLS

HARDWARE

1. Heart Rate Sensor
2. Buzzer
3. LED
4. MQ-9 carbon monoxide and methane gas sensor
5. RPI 4+
6. ESP32
7. NRF24L01 RF Radio Module
8. GPS NEO-6M
9. Wire

SOFTWARE

1. VS code
2. MySQL
3. THINKSBOARD
4. ArduinoIDE
5. CLOUD

CONCLUSION

In Conclusion,

the use of safety helmet for miners is imperative in ensuring the well-being and protection of workers in the mining industry,

by providing a robust and reliable barrier,safety helmets contribute significantly to minimizing the risk of severe injuries and fatality in the workplace….!