

## EFFICIENT IMPLEMENTATION AND DESIGN OF MINE PARAMETER MONITORING AND MINERS LOCATION SYSTEM

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### Abstract

In this paper, the design for monitoring the mine parameters such as humidity, temperature & poisonous gases such as methane is presented. The monitored parameters are compared and stored in the processor. For the values exceeding peak value, then the raspberry pi processor sends signal to the buzzer. The sound from the buzzer indicates the miners that the conditions in the mine are hazardous to work. This gives more time to the miners to react to the situation. In addition to the monitoring system, the location system plays a big role in identifying the miners if they are went inside the mines due to some catastrophes, because of catastrophes the chances for the miners to get decoyed inside are very feasible. In our system we use RFID tags used by the miners to identifying them. This tag possesses the particular frequency and hence it is unique to each wearer which is specific to each tag. These frequencies will be read by the RFID readers interior of the mine and the information will be passed to underground routers which will send the data to the station situated above the ground and send to their family members using android application.

**Keywords—** Ventilated Air Methane stream, Health department, time difference of arrival, Time-of-flight, received signal strength indicator and ZigBee End Device .

## I. INTRODUCTION

Mining is a process where the miners dig tunnel deep below the earth surface to extract minerals such as coal, iron, diamond, gold, etc. This is not an easy job and the workers have to overcome many dangers and obstacles. Unlike the conditions on the surface, conditions interior the mine is life threatening. The temperature, humidity and gas levels are different compared to those on the surface of the earth. In spite of this life threatening conditions the miners working in the mine, work with inadequate safety measures. During mining, the chance of evolution of dreadful gases is high. Also, while tunneling minor chances occurs that water may seepage in the mines nearer to rivers. Thus to prevent this kinds of disasters we have proposed a approach that can monitor these parameters. Also there is chance that the mines may collapse. In such cases, it becomes difficult to locate the miners decoyed inside and plan a rescue mission, as their whereabouts are not known. Hence a system is required that will monitor the parameters such as gas level, temperature and humidity and a means to identify the location of the decoyed miners which is proposed in this project.

### 2. SYSTEM STRUCTURE AND OPERATION

This major idea is to reduce the complexities in the previous system. The parameters interior of the mine such temperature, humidity and gas level are monitored using the respective sensors. The data is send to the ADC of the raspberry pi processor which converts it into digital data. Compare the data with the stored data in the raspberry pi processor. If these measured values reach above a threshold value, an alarm will go off informing the miners that the environment inside is becoming hazardous. This alerts them and provides them enough response time for the miners to safely separate from that environment. In case, if the mine collapses the miners will be decoyed inside the mines. Even if they are alive, it will take more time to plan a rescue mission for saving lives without any proper information about their locations. The miners those wearing RFID tags will be able to get an idea of their locations. The base station will have the monitored data transmitted above the ground using zigbee modules or routers inside the mine. The database contains the stored data for every second the device is turned on.