Industrial Engineering Journal
ISSN: 0970-2555
Volume: 52, Issue 5, No. 5, May: 2023

COAL MINING SAFETY KIT

Mrs. S. Priyanka, Assistant Professor, Dept. Of Information Technology, SNS College Of Engineering.priyankapriya710@gmail.com
Mr. V. Sivaji, Mr .G. Priyan, Mr. J. Sharon Paul, Ms. S. G. Navya, Mr. Subburaj Vijaykumar, Student, Dept. Of Information Technology, SNS College Of Engineering.

ABSTRACT
Now a day's because of heating and climate changes there are difficult things within the field of a coal pit. To scale back the value and improve productivity besides product quality the atomization within the field of a coalpit is so necessary, which can additionally scale back the mine staff efforts. This paper proposes a style of a wireless detector network (WSN) with the assistance of the Nodemcu esp8266 controller that is in a position to observe the temperature, humidity, gas, and standing of smoke in an associate degree underground mine. This method additionally controls the ventilation demand to mine staff relying upon gift climate conditions inside the piece of land. This method utilizes low power, efficient Nodemcu esp8266, a temperature detector LM35, a wetness detector SYSH220, a smoke detector, a gas detector for sensing the mine climate parameters, and Wi-Fi for remote work information central location management to regulate manage the climate state with the assistance of motor and valve control electronic equipment. With the continuous enlarging of exploiting areas and extension of depth during a coal pit, several laneways become blind areas, with unaccountable hidden dangers.
KEYWORDS: climate parameters, coal pit, hidden dangers, exploiting areas.

1. INTRODUCTION
Underground mining operations prove to be a risky venture as far as the safety and health of workers are concerned. These risks are due to the different techniques used for extracting different minerals. The deeper themine, the greater is the risk. These safety issues are of grave concern especially in the case of coal industries. Thus, the safety of workers should always be of major consideration in any form of mining, whether it is coal or any other mineral. Underground coal mining involves the next risk than open pit mining thanks to the issuesof ventilation and potential for collapse. However, the utilization of heavy machinery and the methods performed during excavations result in safety risks in all types of mining. Modern mines often implement several safety procedures, education, and training for workers, health and safety standards, which lead to substantial changes and improvements and safety levels both in opencast and underground mining.

2. LITERATURE SURVEY
Occupational Hazards and Risks in Coal Mining:
Identifying and Assessing Occupational Health and Safety Hazards in Underground Coal Mines: A literature review by Smith et al. (2018).
Analysis of Major Causes of Accidents in Underground Coal Mines: A case study by Li et al. (2017).
Review of Surface Coal Mining Emissions: Environmental and Occupational Health Effects by Clifford et al. (2019).

Mine Safety Regulations and Policies:
International Approaches to Coal Mine Safety Regulations: A comparative study by Zhang et al. (2019). Evaluation of the Effectiveness of Safety Regulations in Underground Coal Mines: A systematic reviewby Brown et al. (2016).
Comparative Analysis of Mine Safety Policies in Different Countries: Lessons learned and best

practicesby Garcia et al. (2018).

Technologies and Innovations for Coal Mining Safety:
Application of Robotics and Automation in Underground Coal Mines: A Review of recent advancementsby Chen et al. (2020).
Wireless Sensor Networks for Real-time Monitoring of Coal Mine Safety: A comprehensive survey byWang et al. (2017).
Virtual Reality and Simulation for Training and Safety Enhancement in Coal Mining: A literature reviewby Zhang et al. (2021).

Human Factors and Safety Culture:
Human Factors in Coal Mining Accidents: A Review of contributing factors and Interventions Johnson et al. (2019).
Safety Culture Assessment in Coal Mining: A systematic review of measurement tools and methodologies by Liu et al. (2018).
Understanding Safety Leadership in Coal Mining: A qualitative study of leadership practices by Robertset al. (2020).

Training and Education:
Effective Training Approaches for Coal Miners: A systematic review of training methods and Outcomesby Davis et al. (2019).
Evaluation of Safety Training Programs in Coal Mining: A case study of a large-scale training Initiativeby Anderson et al. (2017).
Role of Education in Improving Safety Performance in Coal Mines: A literature review by Smith et al.

3. EXISTING SYSTEM

The monitoring and control system is used to monitor the temperature, gas, and fire sensor in the mine, as wellas detect potential hazards. Safety equipment such as protective clothing, helmets, and other protective gear is used to protect workers from potential hazards. The ventilation and dust control systems are used to reduce the amount of dust. Risk analysis and management systems are used to assess the potential risk associated with a particular mining operation. In addition to safety equipment, workers must also be trained and educated on theproper safety procedures and protocols.

4. PROPOSED SOLUTION:

In this proposed system the coal mine safety systems are fixed with gas sensors, fire sensors, andtemperature sensors. Integrate all the sensors to the nodemcu.
First, we need to create a dashboard in the ubidots. In the monitoring system, we monitor all the data fromdifferent sensors. the gas sensor detects the gas in the coal mine environment.
If the gas the level exceeds normal level then the workers get notified and the temperature and fire valuesare monitored inside the coal mine.

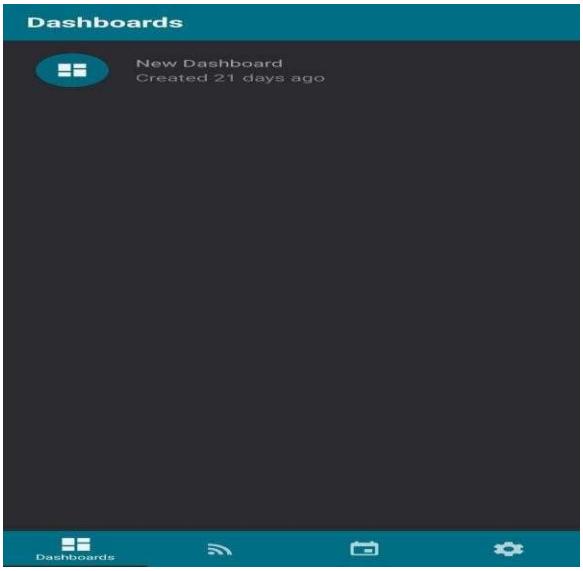
5. SOURCE CODE:

```
#include <OneWire.h>
#include <DallasTemperature.h> #include "UbidotsMicroESP8266.h"
#define DEVICE1 "637cee4747bb67000c343b94"#define DEVICE2 "637cee4e6ac5bf000d94dd9f"
#define DEVICE3 "637cee7ac6accb000c2b32d3"
#define TOKEN "BBFF-MBXOYHUbhAARWXB8KHk20WTuCbJWS0" // Put here your Ubidots
```

Industrial Engineering Journal
ISSN: 0970-2555
Volume: 52, Issue 5, No. 5, May: 2023

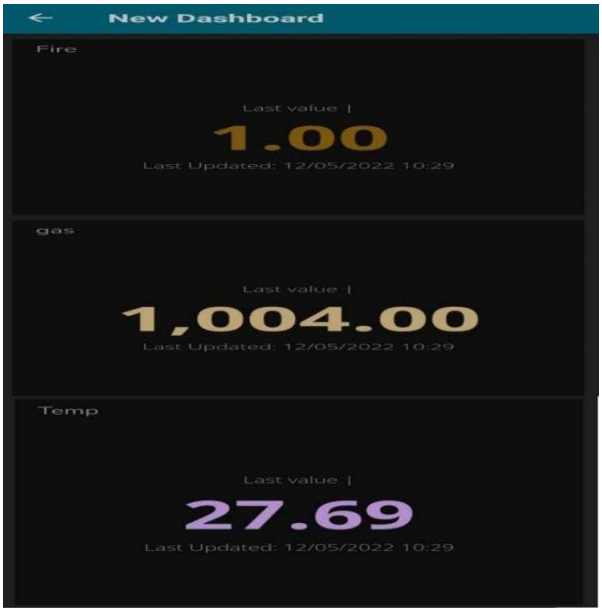
```
TOKEN
#define WIFISSID "Firmware" // Put here your Wi-Fi SSID
#define PASSWORD "Solutions@12345" // Put here your Wi-Fi passwordUbidots client(TOKEN);
#define ONE_WIRE_BUS D5 OneWire oneWire(ONE_WIRE_BUS);DallasTemperature
sensors(&oneWire);int ir=D0;
void setup() {
client.wifiConnection(WIFISSID, PASSWORD);Serial.begin(9600);
sensors.begin(); pinMode(ir,INPUT);
}
void loop()
{
int a=analogRead(A0); client.add( DEVICE1 , a); client.sendAll(false);
sensors.requestTemperatures();
float tempC = sensors.getTempCByIndex(0);client.add( DEVICE2 , tempC );
client.sendAll(false);int b=digitalRead(ir);
client.add( DEVICE3 , b);client.sendAll(false);
}
```

6. RESULT



HOME PAGE

Industrial Engineering Journal
ISSN: 0970-2555
Volume: 52, Issue 5, No. 5, May: 2023



OUTPUT

7. CONCLUSION:

The study on real-time monitoring of gases and other parameters present in underground mines has beenanalyzed using wireless sensor networks. A real-time monitoring system is developed to provide a clearer and2 more point-to-point perspective of the underground mine. This system displays the parameters on the serial monitor at the underground section where the sensor unit is installed and on the monitoring unit; it will be helpful to all miners present inside the mine to save their life before any casualty occurs. Alarm triggers when sensor values cross the threshold level. This system also stores all the data in the IoT cloud.

FUTURE USE

In the future, coal mining safety can be improved by the use of technology such as remote monitoring systems, automated mining equipment, and robotics. Additionally, better safety protocols and training for miners, improved ventilation systems, and the use of protective gear such as helmets, masks, and respirators can help to reduce the risks of coal mining. Improved education about the dangers of coal mining can also help to increase safety in the industry. Finally, the use of renewable energy sources such as solar, wind, and hydro can help to reduce the need for coal mining and the associated safety risks.