# Centralized and Automated Mine Safety System (CAMSS)

<sup>1</sup>A.Lalitha, <sup>2</sup>R.Sudhakar, <sup>3</sup>R.Surendar, <sup>4</sup>N.Venkatesh Kumar

<sup>1</sup>Assistant Professor, <sup>2,3,4</sup>Research Scholar Department of Computer Science and Engineering, Valliammai Engineering College, SRM Nagar Kattankulathur – 603 203, Tamil Nadu, India.

*Abstract* – In Mining Industry Industrial safety is one of the main aspects of industry specially. In the mining industry safety is a very vital factor. To avoid loss of material and human health, damage and provide protection system as well as necessary communication system inside underground mines. To increase both safety and productivity in mine and a fixed base station, inside mines, the wired communication system is not so effective, because of wire can be damaged inside mines. In this project we are going to monitor the Mine parameters like abnormal gas, temperature and humidity sensors to avoid accidents. In this project we provide necessary safety precautions which will be automatically take place when accident occurs and it can be monitored from anywhere using the Internet.

*Keywords*: Data Monitoring, Data Analysis, Internet of Things, Debugging, Remedial actions.

#### **1.INTRODUCTION**

The Internet of Things (IOT) is defined as the inter-networking of multiple devices which are often referred to as connected devices which includes devices such as vehicles, sensors, hardwares, softwares and other components. The Main advantage and fundamental quality of IOT is that it enables remote access to any items or components which are connected over the internet. It gives control over the entire connected devices which will provide an environment between the physical world and the computer system which will also increases the efficiency, accuracy and economic benefits of the the system.

Internet of Things (IoT) will provide advanced capabilities of technological connectivity over multiple devices, systems and services that will be more than Machine to Machine (M2M) communication and it will cover over nearly all areas of domains, protocols and applications

The Frame of Internet of Things (IoT) enables support of interaction between the things and allow complex computing structures like distributed systems and helps in development of distributed applications. Now the framework of Internet of Things (IoT) is focused on real-time data logging which will offer more solutions in working with multiples things and enabling them to interact with and development of future applications which will lead to specific software development process to create an advanced application devices with hardwares which will interact with the help of functionalities of Internet of things . New IoT platforms has been developed which will provide more added and in-depth knowledge and access of the Internet of Things domain. The Internet of Things (IoT) is purely based on connectivity of multiples devices in the physical world and things over the internet via wired connections or wireless connections. The sensors are main aspects used in Internet of things systems and these sensors are connected with other devices over the network. The network maybe of LAN, NFC, Bluetooth, Wi-Fi, ZigBee, Raspberry Pi. These sensors can also be used to provide messaging services over the bands like GSM, 3G, LTE and GPRS systems

## 2. PROPOSED SYSTEM

In this system we propose the safety measures that are needed to be taken inside the mining facility to save human lives and less damage to the technological equipment and prevent loss in investment and lives.



We propose a system where every monitoring and control of safety measures can be done automatically without any manual involvement and this helps in saving human lives and reduces time and avoids damage.



Chart -2: Workflow inside mine

The workflow inside the mine is fully based upon the monitoring system and taking necessary safety measures when an accident occurs, inside the mine the sensors are used to detect the change in temperature, humidity and gas flow. When there is an abnormal activity inside the mind the sensor is detected and the alarm is triggered and informs all the workers to take safety precautions and the remedial action are carried out inside the mine when there is an accident inside the mine.



Chart -3: Workflow outside mine.

Outside the mine the data is collected using the sensors and the values of the sensors are in analog so using the MCP3008 we convert the analog data into digital data for processing the threshold frequency and then when the values are above the normal threshold level the alarm is triggered and the increase and change in values are automatically updated and seen in the CAMSS portal which is created using the webpage and can be viewed using the Internet and it can be accessed from anywhere and when the abnormal rise is shown the CAMSS system will automatically provide the necessary safety precautions and will send the authenticated person a message that an accident has occurred and immediate assist and maintenance is needed and it enables control over the entire system using the wireless network.

#### 3. CONCLUSIONS

As per the literature survey done, All the systems that are carried out in the mining facilities have manual controls over the monitoring and prevention systems and each system propose that the sensors are used to monitor the changes and collect dates in the mine and transmit those data through wired and wireless data network and it is applicable only through short range area and these systems need manual operations for any further analysis and actions in the mine. Hence all these system are not providing automated and centralized monitoring system methods.

#### 4. FUTURE WORK

To Provide more data monitoring and automated safety precaution methods inside mine to avoid accidents and damages and to provide large and wide area access to all monitoring systems and control over the mine safety system using IoT in an more extended and advanced structure.

### REFERENCES

- [1] International Organisation for Standardization, Occupational health and safety ISO 45001
- [2] X. Chen and P. Yu, Research on hierarchical mobile wireless sensor network architecture with mobile sensor nodes in International Conference on Biomedical Engineering and Informatics, IEE, 2010
- [3] P. Deshpande and M. Mandankar, Techniques improving throughput of wireless sensor network, in International Conference on Circuit, Power and Computing Technologies, IEE, 2015.
- [4] Network Topology and Extent. In Communication Networks: Prnciples and Practice, McGraw Hill Education, 2005.
- [5] Y. Choi, Y. Jeon and S. Park, A study on sensor nodes attestation protocol in a wireless sensor network, in International Conference on Advanced Communication Technology, IEE 2010