

INTELLIGENT HELMET FOR COAL MINERS

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Abstract-In this work, a safe Coal Mine Monitoring system which replaces the traditional coal mine monitoring systems which tend to be wired network systems. This play an important role in coal mine safe production. With continuous enlarging of exploiting areas and extension of depth in coal mine, many laneways become monitoring blind areas, where are lots of hidden dangers. Moreover, it is inconvenient to lay cables which are expensive and consume time. In order to solve the problems, we designed a coal mine safety monitoring system based on wireless sensor network, which can improve the level of monitoring production safety and reduce accident in the coal mine. Zigbee technology provides a direction for scientists who commit to solve the safety monitoring problems of coal mine. Manual tracking has a number of limitations. A miner's location may be given as being within a working section that can be quite large and therefore difficult to pinpoint a miner's exact location. Occasionally a mine worker will forget to notify the dispatcher when moving to another work location. Thus we use RFID Reader technology. The purpose of this study is to propose a solution suitable to mine wireless communication, safety monitoring, give a proof to the further study.



Example of an ultra-wide band (UWB) tag in a mine.

A variety of products for the current diversity of coal mine safety and underground coal mining process variability space, mine safety wireless network should be compatible with existing mine safety system with data transmission functions, has good flexibility, scalability, self- set of network capabilities. As the mine has its own special applications require a simple sensor network protocols, network easy, self-organization, self-healing ability. Zigbee is a wireless communications technology, with a short distance, safe and reliable, you can use Zigbee technology to collect the various parameters of the terminal transmitted to the sensor on the tunnel gateway, and then use a wired data transmission to the gateway on the ground central control computer, by computer analysis and comparison of the data in order to assess the security situation in the Mine.

I.OBJECTIVES

We designing an intelligent helmet for coal miners based on wireless sensor network. It is use for pin-point a miner's exact location. An intelligent helmet is easy to handle. It has high transmission rate. It is applied in underground working, Coalmine, Industries, Tunnels.



Brief history:

At earlier time, many problems occurred in the coal mines. At that time the wired communication was used, which had many drawbacks and limitation. The sensors were used separately in coal mines and the sensitivity of sensors were not much, so levelsofaccidentwerehigh(1).

II.DESCRPTION

Hardware

Zigbee-Zigbee is a wireless communication media which has long battery life and secure networking. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs, such as Bluetooth or Wi-Fi. ZigBee has a defined rate of 250 Kbit/s.

Microcontroller-we are using microcontroller ATMEGA 16. AT - It stands for the company that produced the microcontroller, ATMEL.

MEGA - Stands for the family of Microcontroller. The other families from Atmel are Tiny & X-Mega.

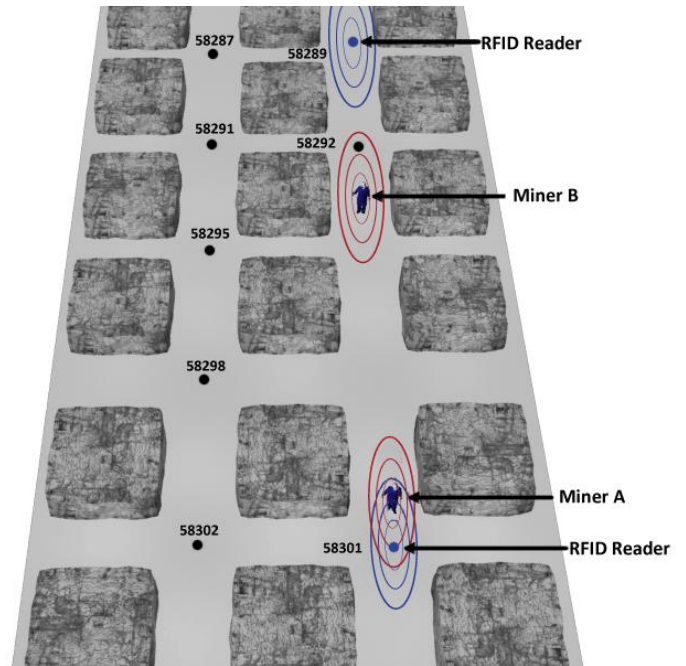
16 - Stands for the 16KBflash memory that is present in the microcontroller (7).

Methane Sensor - This is a simple-to-use compressed natural gas (CNG) sensor, suitable for sensing natural gas (composed of mostly Methane [CH₄]) concentrations in the air. The Methane sensor can detect natural gas concentrations anywhere from 200 to 10000ppm.This sensor has a high sensitivity and fast response time (7).

Temperature Sensor - Temperature sensor is used for sensing the temperature. It has an operating temperature range of -55°C to +125°C and is accurate to ±0.5°C over the range of -10°C to +85°C(7).

Humidity Sensor - Humidity is the presence of water in air. The amount of water vapor in air can affect human comfort as well as many manufacturing processes in industries. Hence, **humidity sensing** is very important, especially in the control systems for industrial processes and human comfort (7).

Zone Based RFID-It is based on readers positioned in known locations within the entries, and each miner wearing an RFID. The tag is read whenever the miner passes within the RF range of a reader. Each RFID reader has a unique identification and a location associated with that identification, so that when a tag is read by a given reader.



Software

Visual Basic 6 – Visual basic 6 is a high level programming language which evolved from the earlier DOS version called BASIC. BASIC means **B**eginners' **A**ll-purpose **S**ymbolic **I**nstruction **C**ode. It is a relatively easy programming language to learn. The code looks a lot like English Language. Different software companies produced different versions of BASIC, such as Microsoft QBASIC, QUICKBASIC, GWBASIC, IBM BASICA.

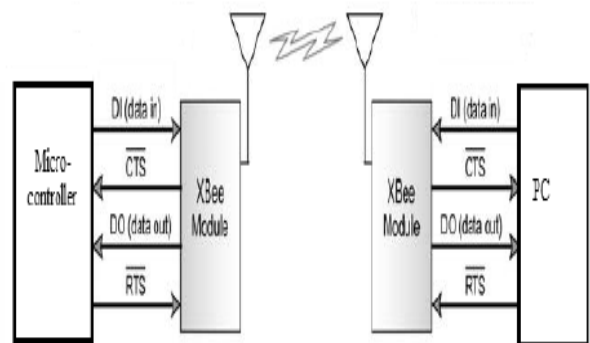


Figure 2 Connections through Zigbee module

III.ADVANTAGES

This devices can be operated from anywhere in the world. It is efficient and low cost design. This circuit consume low power. It is Real time monitoring. The system is very simple. And easy to operate. In this system Data is more secure. It has high transmission rate and larger distance is covered. It is highly reliable.

IV.APPLICATION

It can be applied to the person who are working in underground.It can be applied at any working condition. In this system detection of worker's location. It is use in coalmines, Industries and Tunnels

V.FUTURE SCOPE

Zigbee Router modules can be used to cover larger distance.

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