WSN Based Coal Mine Monitoring

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Abstract- *A Wireless Sensor Network (WSN) consists of a large number of spatially distributed devices (nodes) with sensing, data storage, computing and wireless communication capabilities. Low size, low cost and particularly low power consumption are three of the key issues of WSN technology*

In earlier days, for coal miners LED type helmets are extensively deployed in large and medium-sized coal mines because of their flexibility of light weight and low power. Meanwhile Zigbee based wireless sensor networks are recently investigated due to their remote environment monitoring capabilities. Such a network can easily collect sensor data and transmit by radio. By integrating these two advantages we design a new smart new helmet, which can be enable as a mobile node of Zigbee wireless sensor networks, gathering parameters from underground timely and quickly. Moreover miners can also exchange information from control centre through wireless communication. It is convenient for centralized management to build real-time surveillance on environment parameters, so potential safety problems can be avoid by early-warning intelligence.

Keywords- Zigbee, Sensors

I. INTRODUCTION

A Wireless Sensor Network (WSN) consists of a large number of spatially distributed devices (nodes) with sensing, data storage, computing and wireless communication capabilities. Low size, low cost and particularly low power consumption are three of the key issues of WSN technology. Nodes are designed to operate with minimal hardware and software requirements. They often use 8 or 16-bit microcontrollers at low processing rates and a limited RAM capacity for data storage. Nodes often require a few milli watts for operation. Most nodes can be set in a standby state, from which they wake up occasionally, for instance when one sensor detects an event. Their radio transceivers are also very energy efficient and their transmission range is 1typically less than 100 m in the open air. Besides, its bandwidth is often low.

II. LITERATURE SURVEY

The main purposes of the literature survey are:

– To investigate and present what has been done in the non-

coal underground mine fire field in the past.

– To give recommendations on the continued work with regard to fire safety in underground non-coal mines.

The main source for this survey has mainly been the following organizations, scientific journals and other scientific publications:

"Development of Coalmine Safety System Using Wireless Sensor Network", International Journal on Computer Science and Engineering, ISSN: 0975-3397 Vol. 3 No. 5 May 2011, In the Era of embedded technology, the Zigbee protocols are used in more and more applications because of the rapid development of sensors, microcontrollers, and network technology, a reliable technological condition has been provided for our automatic real-time monitoring of coal mine. The application designs a monitoring system for coal mine safety based on Zigbee wireless sensor network. The underground system collects temperature, humidity and methane values of coal mine through sensor nodes in the mine; it also collects the number of personnel inside the mine with the help of an IR sensor, and then transmits the data to information processing terminal based on ARM.

"Zigbee Based Mine Safety Monitoring System With Gsm", International Journal of Computer & Communication Technology, ISSN: 0975 - 7449, Volume-3, Issue-5, 2012, 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. ZigBee wireless sensor nodes mainly consist the sensor unit, signal conditioning circuitry, microcontroller (MCU), RF modules MC13193, timers, memory and power management module. Micro-controller is responsible for collecting environmental information (such as temperature, carbon monoxide, methane, wind speed, etc.) and do some data conversion, responsible for controlling and managing the entire nodes.
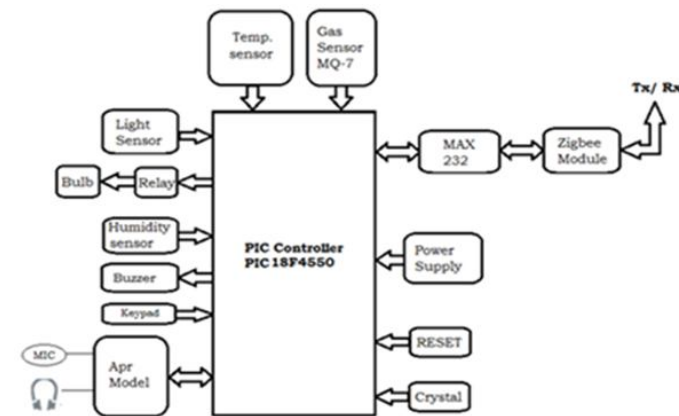
2012.

Block Diagram-

Fig. Block Diagram of WSN based coal mine monitoring

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