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Assessment of Can Based Coal Mine Safety Monitoring and Controlled Automation.

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ABSTRACT

This paper addresses an economical and continuous monitoring system of under- ground mine workers protection and security. The mine safety monitoring system plays a major concern in almost all the countries as it requires large amount of explosive gases and chemical for its operation. Workers in the underground environment are of major concern in considering the safety measures in the mine sectors. In coal mines, whenever explosions or gas leakage occurs the mine workers who working inside the mine are not aware of environmental conditions because the monitoring systems inside coal mine may destroy or damage. It makes the workers life very risky. It also takes long time to rescue workers. By using WSN, gas sensors were used for monitor underground parameters. A microcontroller is used to collect and store the data and also it makes the decision accordingly, based on the workers is informed through the alert system. For communication purpose Zigbee IEEE 802.15.4 standard is used for transmission between the hardware circuit fits with the mine station and ground control computer system through some routers.

Keywords: mine workers, gas sensors, WSN, microcontroller based system.

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INTRODUTION

Underground mine safe usually extensive labyrinths, of which the tunnels are generally long and narrow with a few kilometers in length and a few meters in width. thousands of mine workers are needed to work under extreme conditions according to the construction requirements ,and hundreds of miners die from mining accidents every year. It is now widely approved that the underground mining operations are of high risk.

Traditionally, coal mine safety monitoring and automation systems were typically designed to meet the requirements of a single monitoring application. The coal mine application has already gone beyond the interconnection of a few large back-end systems, and more and more underground physical devices make the state of objects and their surroundings seamlessly accessible to software systems. Recently, in the area of comprehensive application integration, some works have introduced the use of "CAN" concepts, also known as controlled area network applications. The CAN based coal mine monitoring and control automation needs to rapidly coordinate interaction between the business processes and distributed , multisource sensory devices .Also ,the CAN based middleware for coal mine monitoring and control automation should change dynamically in a real-time way confronting with continuously and constantly changing for the underground coal mine physical world.

RELATED WORKS

Integrated Mine Safety Monitoring and Alerting System Using Zigbee & Can Bus:

With nonstop extending of misusing zones and expansion of profundity in coal mine, numerous laneways move toward becoming observing visually impaired zones, where are heaps of concealed threats. Besides, it is badly designed to lay links which are costly and expend time.

In request to take care of the issues, we outlined a coal mine wellbeing checking framework in view of remote sensor arrange, which can enhance the level of observing creation security and lessen mischance in the coal mine. Zigbee innovation gives a bearing to researchers who resolve to take care of the security observing issues of coal mine. In this Paper we utilize CAN Bus alongside Zigbee innovation to lessen the cost and increment enhance the speed of correspondence between base station and match up hubs

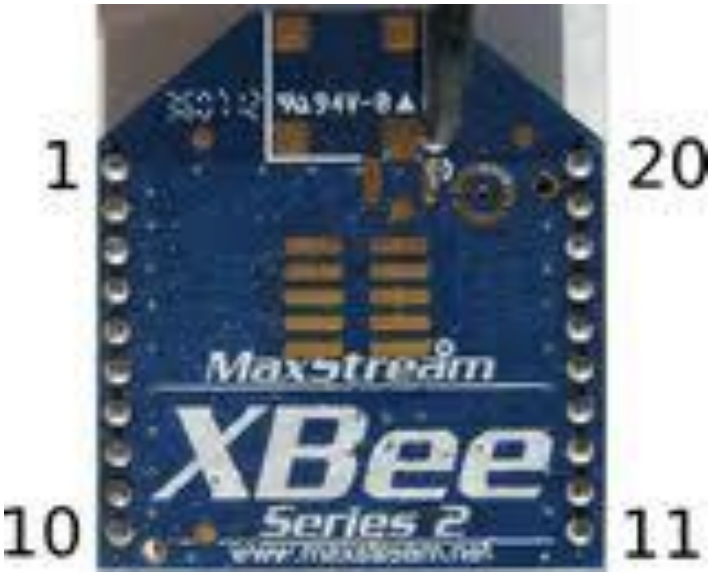

Fig 1: Representation of zigbee.

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NETWORK MODEL:

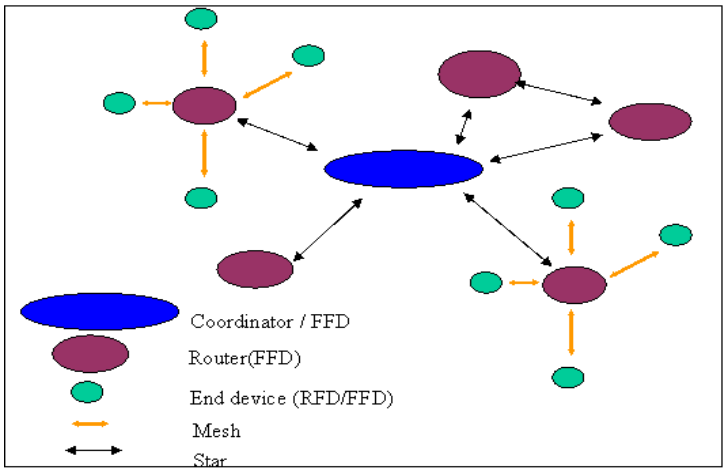

Fig 2: Data network model of zigbee

Zigbee Based Wireless Alerting System:

Safety is one of the main aspects of an industry, especially for mining industry. There are several types of Toxic gases present inside the mining area. These toxic gases having high temperature inside mining area causes damage to human health. To avoid these type of unwanted phenomena, a safety monitoring system is essential inside the mining area. To increase the safety and productivity in mines, a communication must be established between workers and a fixed base station. But, inside the mines wired communication system is difficult to reinstall in case of any damage. Owing to the special environment of the underground mining system, the proposed system is designed to replaces the earlier coal mine monitoring systems which tend to be wired network systems. The sensors which are interfaced with the controller will sense the temperature and gas present in the mining environment. Both the temperature and gas values are displayed on LCD. These values are sent to the base station by using zigbee module and displayed on computer in the base station. When any of the sensed parameter increases above threshold level, warning will intimate to miners by voice message.

Smart Helmet for Coal Miners using Zigbee Technology:

This project observes on a mine supervising system which is based on the cost effective Zigbee system. Our project aim to develop a wireless sensor networks, realized real time surveillance with early-warning intelligence on harmful gases, temperature in mining area used zigbee communication to reduce potential safety problems in coal production using a Zigbee wireless technology. All of these three parameters are detected continuously by temperature sensor, gas sensor and humidity sensor, if they cross the pre-defined limit, then the user gets alert by the buzzer will automatically turns on with LED indications.. The values from different sensors are continuously transmitted by zigbee transmitter to the remote monitoring unit which are received by zigbee receiver module.

Zigbee based mine safety monitoring system with gsm:

In this work, a Coal Mine sheltered Monitoring framework which replaces the conventional coal mine checking frameworks which has a tendency to be wired system frameworks. This assumes a noteworthy part in coal mine sheltered creation. With ceaseless developing of abusing regions and augmentation of profundity in coal mine, numerous laneways get to be observing visually impaired zones, where are bunches of concealed perils. In addition, it is badly designed to lay links which are costly and expend time. With a specific end goal to tackle these issues, we planned a coal mine security checking framework in light of remote sensor organize, which can enhance the level of observing creation wellbeing and lessen mischance in the coal mine. Zigbee innovation gives a course to researchers who resolve to tackle the wellbeing checking issues of coal mine. The

point of this review is to propose an answer reasonable to mine remote correspondence, security observing, give a proof to the review of to the further review

PROPOSED SYSTEM

- The proposed system considers three stations which are mobile station, base station and master node**.**
- In the proposed system we are using Zigbee as a wireless communication which is used to send the sensed data to the base station node.
- Those values from base station will be sent using CAN bus to the control server.
- This mobile station is a wearable device will be fixed to the body of the workers
- This module consists of temperature sensor, gas sensor, zigbee device and emergency button, buzzer and a display device connected with a micro controller
- The purpose of this device is to monitor the workers health and check the coal mine environmental conditions.
- This station node consists of a RFID reader, zigbee module and display device connected with a microcontroller and The base station nodes are placed inside the mine.
- The miner's attendance maintenance is also done by reading the miners tag at the base station using a RFID reader and stored in the server.
- The emergency button is used to give emergency alert to the control room regarding the gas leakage.
- If any gas leakage, the miners will be alerted by an alarm using buzzer. And Temperature sensor is used for monitoring their surrounding temperature**.**

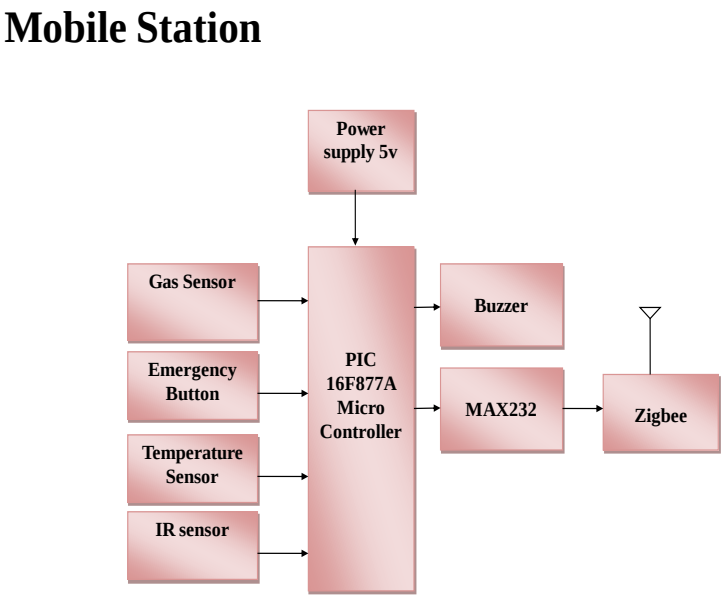

Fig 3: Block diagram of mobile station

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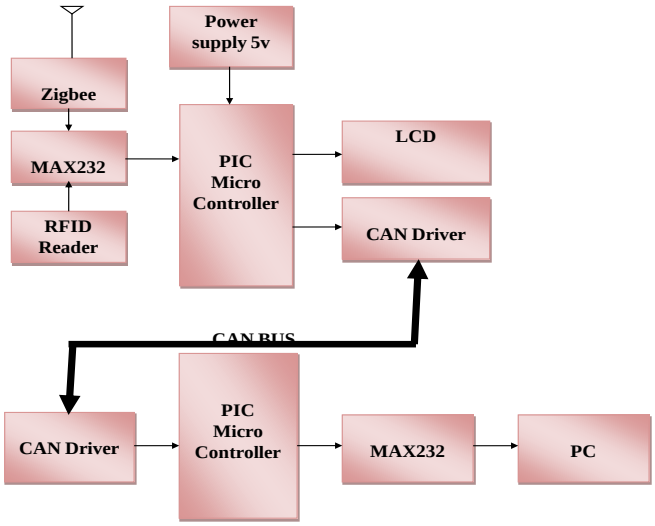

Fig 4: Block diagram of base station

CONCLUSION

This paper builds CAN based for coal mine safety remote monitoring and control automation and Focus on the design and implementation for underground ZigBee wireless sensor network deployment, uniform devices access framework, distributed data distribution service. Since most of the application is Web-based, any personal computer and a web browser can connect the Internet and enter the Web page to use the application, and which can reduce the costs of coal mine safety monitoring and control automation. Therefore, it is expected to be a main contribution to coal mines for better and safer working environments. Several issues remain to be addressed further. First, as the expansion of existing coal mine safety monitoring and control system, visualization technology can further improve the visibility of underground sensor objects, such as 3D technology, which provides significant support for decision making and real-time control in underground mines. Second, it is essential to optimize the real-time data distribution service and data congest scheduling strategy with different lab

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