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A Measurement of Medium Range of Underground Coal Mine Using Wireless Sensor Network

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Abstract--In this paper can extend and intend to monitor subversive coal mine by using the transceiver ZigBee wireless network. It can detect three ways of sensor that is humidity sensor, temperature sensor, gas sensor. Ones it can increase and decreases the range immediately sensed and intimate by wireless network. By using ZigBee terminal underground soil erosion can also monitor the main station of the coal mine area. It can be controlled by an ARM7 processor to extend the performance. The terminal can use to send the data a person changed their ways or route to mining the coal via ultra limit ray to signal them. Some advantage can be held to sense each and every time, temperature, gas, humidity with secure the persons for real time working surfaces

Keywords: ARM7 processor, sensor, ZigBee, speaker, buzzer, gloves, PIR sensor, MEMS.

I. INTRODUCTION

Coal mining can be essential use for producing energy source in our country. It can taken underground on the earth .Due to searching coal on underground can causes many problem like temperature increases and decreases ,humidity changes, and also breathing problem to human health. To avoid any types of unwanted phenomena all mining industry follows some basic precaution and phenomena [1] Communication can held crucial motivation to keep away from hazards related sanctuary and wellbeing manner. Safe, efficient and economical control over the operation of underground drainage system is one of the effective ways to reduce the production expenses of coal mine and is of great consequence to safe production in coal mine.

Nowadays technology can be growth very well on our country. To correspond one place to other through wireless sensor networking. In this paper using ZigBee wireless sensor network can communicated underground to host station here using three sensor medium like temperature sensor can used to monitor temperature .gas sensor can be monitor LPG.last humidity sensor can be monitoring humidity. Whenever intimate right away various changing any sensor range to host section and main section. Using ARM7 processor can inbuilt all performance and also connect many number of pins on port. While person search coal on underground in main section can intimate. Through voice by using speaker. Through using buzzer can alter where the person goes wrong way and also warning to exhausting them. Also now using two sensors to detect any fire and earthquake occur on underground area. Sensor named as PIR sensor and MEMS sensor. These are used for human safe and secure working on subversive area.

II. LITERATURE SURVEY

In this paper can extend and intend some new technology to overcome some disadvantage. In during secretive coal mining incisive a person can breathe easily and prevent from accident that can't give important to person sheltered [1].[2] Accessible system using pic microcontroller can perform secure with low performance. [3] While a person can go underground coal mining with correct way once can go alternate occurs some problem to find out anyone. [4] ZigBee can transfer only 40km but here increases the data base to wide range the aloofness as we desire. [5] Existing system relies on massive hardware that consists of PLC, two 12-bit channel ADC modules and 10 inch touch screen. This system is based on the ARM7 microcontroller to devise the absolute system, which offers high recital and very low power outflow. [6] In this manuscript using ZigBee and WI-FI transmitted the information to host station. [7] It can use CCTV camera to sense the motion of the human using pic microcontroller.

[8] MSP430 microcontroller can be perform low power and is cost efficient. [9] PIC can be inbuilt process, but it can't use two applications on the same controller. [10] Here detect information using pic microcontroller in embedded system

III. PROPOSED SYSTEM

In this paper's ideology can taken has more secure to work underground coal mine. With the purpose of now carry out some

advanced trend to implement within our convoy. Here using ARM7 processor is the world's most extensively used 32bit Embedded processor family.

Both person section and monitoring or host section two ARM7 processor. ZigBee can be used for transceiver performance it can be high cost, but performance level increases. Maximum ZigBee covered the distance 40km to increases database to extend the distance. The sensor can be used to intimate any false or danger occur underground coal mine where person goes.

Temperature sensor can be used sense heat level of human and surrounding

Humidity sensor can be used to sense moisture on the surrounding

Gas sensor can be used to sense the oxygen level of the atmosphere

MEMS can be used as minute particles can be sensed

PIR sensor can be used to sense prevent from earthquake and heat level. These all are sensational to intimate through the ZigBee wireless sensor network through person section and monitoring section. Eventually to wearisome helmet and gloves is significant to the person where their forget to wear helmet and gloves mistaken intimate can be given to the main and person section through voice message using speaker and buzzer alter can be used for intimated person goes wrong ways.

IV. BLOCK DIAGRAM DESCRIPTION

A. ARM7 Processor

ARM is an abbreviation of advanced RISC machine.ARM processor is the world's most widely used in embedded family.ARM7 are introduced 1994 in the ARM processor family. It consists of 32 bit devices. Many advantages compare to PIC microcontroller, it can perform one or two applications in single ARM processor. It can contain small numbers of instruction set compared to a PIC microcontroller. In theARM7 processor a pin can implement two functions and its performance is high speed.

B. Sensor Unit

The sensor is a type of transducer it can give output with respect to the input. The sensor can be classified into many types now here using 5 sensors, there are: PIR sensor, Temperature sensor, humidity sensor, gas sensor, MEMS sensor.

1) *PIR Sensor*: Passive Infrared Device (PIR) can be used for motion based detector sensor. It can be used to find out the movement of the particles and person and temperature.
2) *Temperature*: It can be used to detect the range of the temperature of human and atmosphere.
3) *Humidity*: It can be used to sense the moisture of the atmosphere of the underground coal mine.
4) *Gas*: It can be used to sense an oxygen of the person in underground on the earth
5) *Mems*: It can be used to sense the micro chemical machine on the underground coal mine

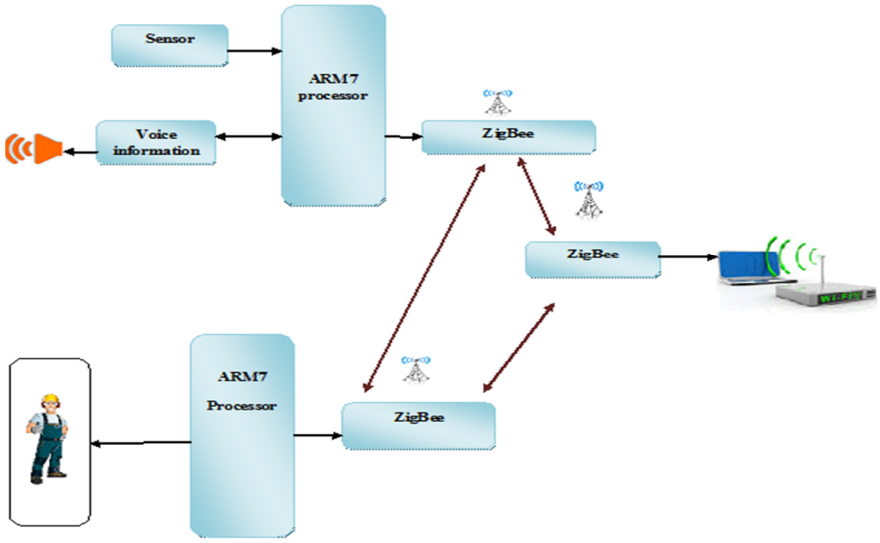

Fig2. Block diagram of coal mine ZigBee wireless sensor

C. ZigBee

ZigBee is a mesh network specification topology .it can transfer 40km distance area. By using ZigBee is energy efficient and low data rate transfer .To extend database the distance will be increased as per we required. It can operate on IEEE 802.15.4 protocol specification can create the network. ZigBee can be used to transmit and receive the signal.

V. SOFTWARE REQUIREMENT

A. KEIL Software

We utilize KEIL µ vision3 software for programming the LPC2148 microprocessor. The software solves the complex problems facing embedded software developers. The µ Vision IDE sets all compilers, assembler, linker, and memory options.

B. Flash Magic

Flash Magic is a PC tool for programming Flash base microcontrollers /microprocessors from NXP via a serial or Ethernet Protocol while in objective hardware. The use of flash magic is to download the .hex file to the ARM processor.

C. Proteus

Proteus Design Suite (also known as Proteus VSM or Proteus [version number]) is a powerful electronic design application, available from Labcenter Electronics. It offers a range of design features including: Schematic capture, Mixed-mode (analogue and digital circuit) electronic circuit simulation, Microprocessor / microcontroller Simulation, PCB design with manual and autrouter options Graph-based simulation.

Proteus 8 is one of the most tools for Circuit designing and simulation which includes:

1) Application Framework : Single integrated application with ISIS, ARES and 3D Viewer appearing as tabbed modules. Switch between tabs on a single monitor (e.g. laptop) or drag and drop tabs to view in separate windows.

2) Common Parts Database : Unified database of all parts and elements in the current project. Enables automatic updating of data between Proteus modules (e.g. Schematic and PCB).

3) Live Net listings : A live net list is now maintained and accessible throughout the system. Enables changes on the schematic to be reflected across PCB, BOM and Design Explorer in real time.

4) 3D Viewer : Now supports DirectX (as well as OpenGL) and runs multithreaded. Includes live update mechanism so Changes made in ARES are reflected in the 3D Viewer.

*5) Bill Of Material*s : Completely new BOM module with PDF, HTML and Excel output. New Property Editor Grid allowing you to easily add data to the report.

6) VSM Studio – Integrated IDE for Proteus VSM simulation and debugging. Automatically sets up compilers and debugs Target firmware.

VI. SIMULATION OUTPUT

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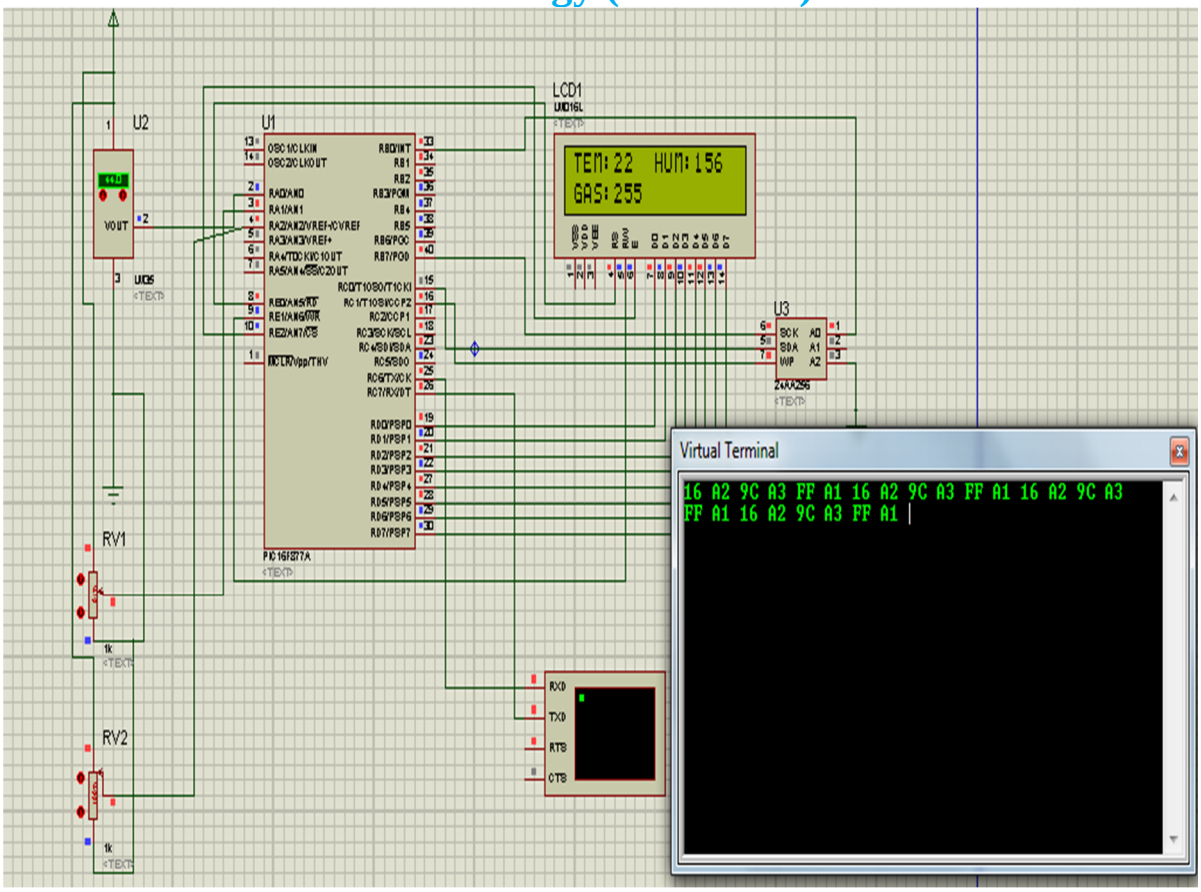

VII. CONCLUSION

This paper presents as a measurement of medium range of underground coal mine using wireless sensor network. Form this paper can use to sense every range simultaneously to intimate main section and control section through ZigBee transceiver. Using speaker to intimated where a person's not wearing helmet and gloves properly and also travelling route on underground coal mining

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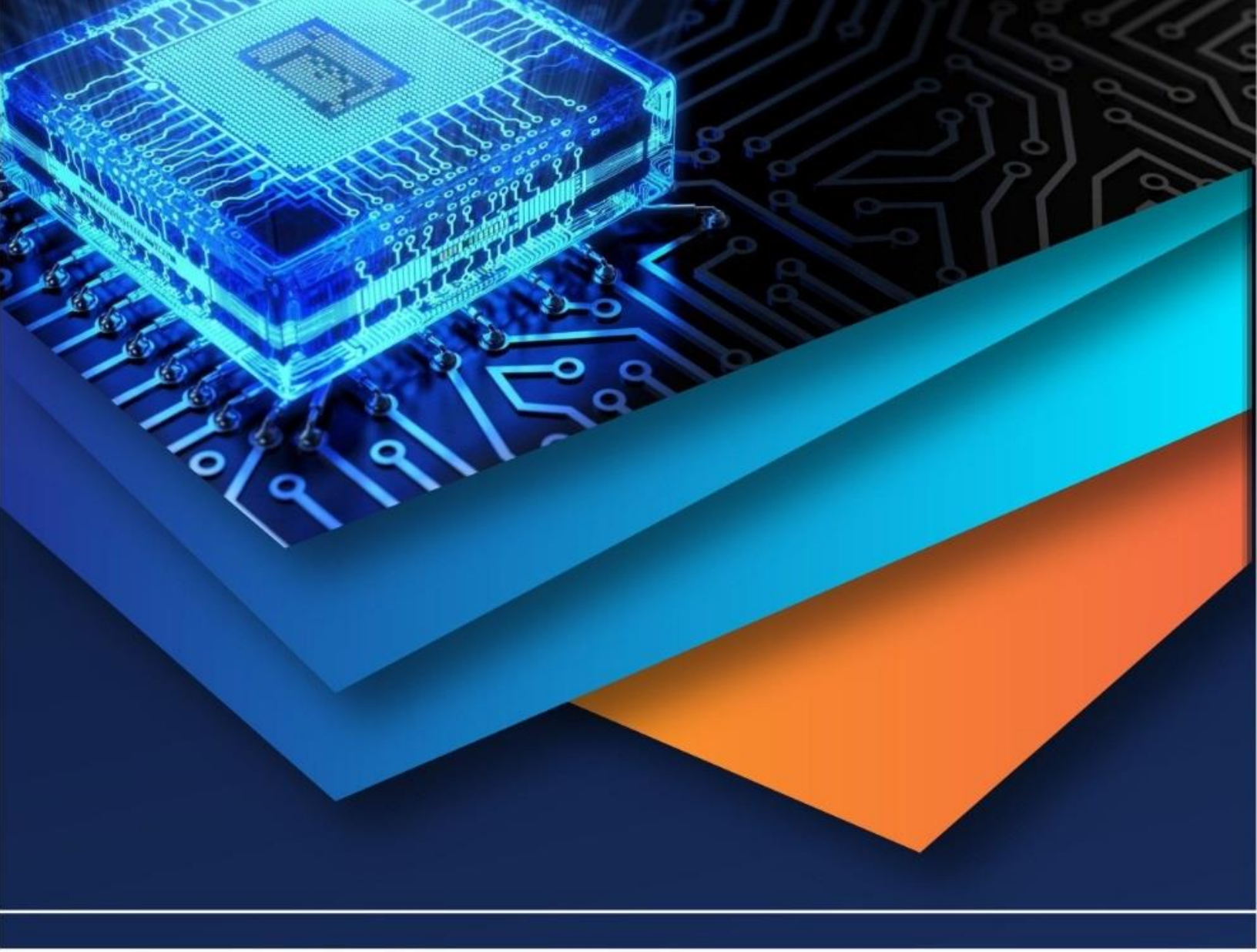

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