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INTERNET OF THINGS BASED AN INTELLIGENT HELMET FOR WIRELESS SENSOR NETWORK

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ABSTRACT
The main aim of the paper is to develop a smart helmet for mining industry workers. The problem addressed in this paper was the improvement of a mining helmet in order to ensure more safety awareness between miners. When working with noisy equipment, being aware of one's surroundings can sometimes be challenging. In the mining trade miners tend to get rid of their safety gear because the gear is too significant, heat or uncomfortable to work with. So this system is developed to intimate the authorities in critical conditions. To overcome the above problem, we are developing a smart helmet for mining industry workers. Firstly to identify the worker, each worker will be having different tag. Once the tag is identified, person's data will be sent to the PC through ZIGBEE. In order to check whether the worker has been using the helmet or not, IR sensors are used to check the helmet presence. The surrounding hazardous gases will be detected by the gas sensor present in the helmet. When gas is detected voice notification will be given through speaker. By the use of MEMS sensor, the head injuries occurrence will be identified. All the data related to sensors will be posted into the PC through ZIGBEE transceiver.

Keywords: PC, MEMS, ZIGBEE, IR SENSORS.

I. INTRODUCTION
The problem addressed in this paper was the improvement of a mining helmet in order to ensure more safety awareness between miners. When working with noisy equipment, being aware of one's surroundings can sometimes be challenging. In the mining trade miners tend to get rid of a number of their safety gear as are result of the gear is just too significant, heat or uncomfortable to figure with. However, miners generally do not remove their helmets. Presently mining safety helmets only have the purpose of protecting the miner's head against potential hazardous bumps. The security helmets don't have any technology added to that to let manual laborers understand once a fellow miner has encountered a hazardous event. Therefore the purpose of the paper described in this paper was to modify an existing mining safety helmet to make the helmet even safer by adding a wireless sensor node network. The task was extended to designing the system small enough to fit into the safety helmet and last long enough while running on battery power. A further challenge was to modify the helmet without changing its physical structure. The added weight had to be kept to a minimum. A mining helmet needs to be modified to improve manual laborer safety by adding intelligence to the helmet.

Scope of the Paper:
The system developed here uses ZIGBEE technology for the improvement of a mining helmet in order to ensure more safety awareness between miners. Every miner is given a unique tag through the reader identifies miner having the helmet. The reader sends the details to microcontroller. The microcontroller sends the data to pc. The pc verifies the helmet for miner details and if any miner didn't ware the helmet the pc informs to microcontroller about helmet absence. Microcontroller sends an alert to the corresponding person about the occurrence of event of the miner.

Problem Identification:
Firstly to identify the worker, each worker will be having different tag. Once the tag is identified, person's data will be sent to the PC through ZIGBEE. In order to check whether the worker has been using the helmet or not, IR sensors are used to check the helmet presence. The surrounding hazardous gases will be detected by the gas

sensor present in the helmet. When gas is detected voice notification will be given through speaker. By the use of MEMS sensor, the head injuries occurrence will be identified.

II.   SYSTEM ANALYSIS AND DESIGN

After connecting all the devices then power up the device.When the device starts booting from flash, It first loads the Linux to the gadget and initializes all the drivers and the core kernel. After introduction of the part it first checks whether all the devices are working impropriately or not. After that it stacks the record frame work and starts the startup scripts for running necessary processes and daemons. Finally it starts the main application. When our application starts running it first check all the devices and resources which it needs are available or not. After that it checks the connection with the devices and gives control to the user.

III.   EXISTING SYSTEM

The problem addressed in this project was the improvement of a mining helmet in order to ensure more safety awareness between miners. When working with noisy equipment, being aware of one's surroundings can sometimes be challenging. In the mining trade miners tend to get rid of some of their safety gear as aresult of the gear is just too significant, warm or uncomfortable to work with. So this system is developed to intimate the authorities in critical conditions.

Proposed System
To overcome the above problem, we are developing a smart helmet for mining industry workers. Firstly to identify the worker, each worker will be having different tag. Once the tag is identified, person's data will be sent to the PC through ZIGBEE. In order to check whether the worker has been using the helmet or not, IR sensors are used to check the helmet presence. The surrounding hazardous gases will be detected by the gas sensor present in the helmet. When gas is detected voice notification will be given through speaker. By the use of MEMS sensor, the head injuries occurrence will be identified. All the data related to sensors will be posted into the PC through ZIGBEE transceiver.

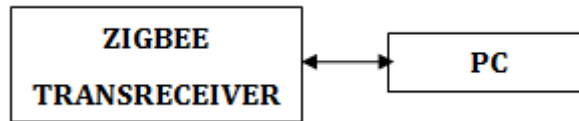**Helmet section**
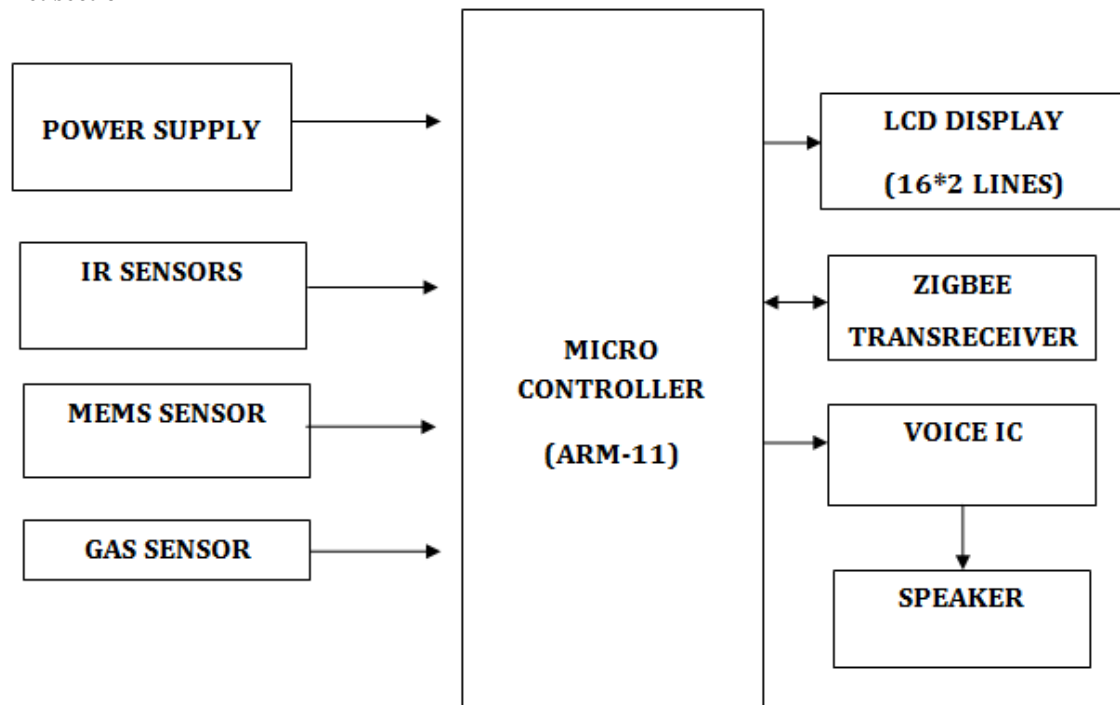
Monitoring section

Figure 1: Block Diagram Description

IV.   IMPLEMENTATION

This micro-model was implemented based on highly a programmable electronic board (ARM11-Raspberry PI-3 Model-B), In this system the helmet having the 3 sensors like gas, mems and IR sensors to monitor the conditions in coal mine. If there is any hazardous situation in the mine the helmet gives the information to the control station through the zigbee transmitter and the control station will alert the coal miner using the zigbee receiver by making the buzzer active the positioned in the helmet so that a miner can have a chance to rescue his life from the hazards occurred in coal miners.

Results

When power on the kit and with all devices are connected**.** The poison of mems sensor is set to x-direction(person having the helmet).
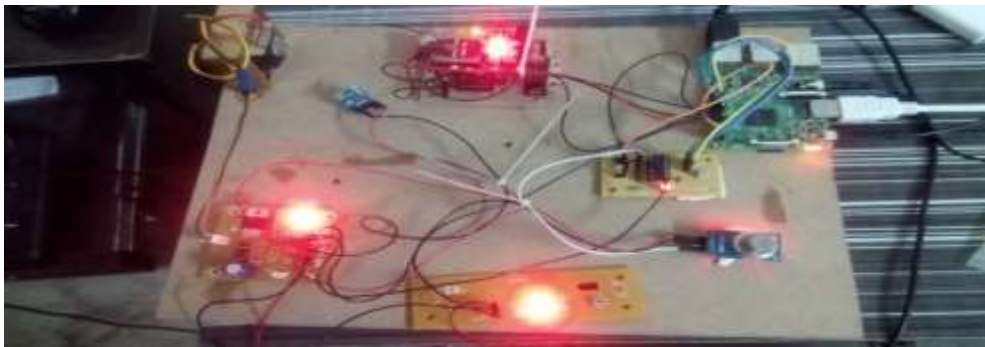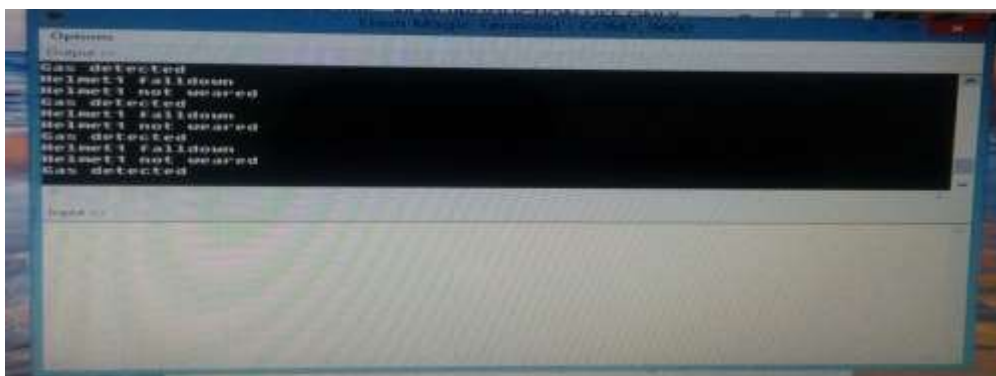

Figure 2: Hardware initial setup with all devices
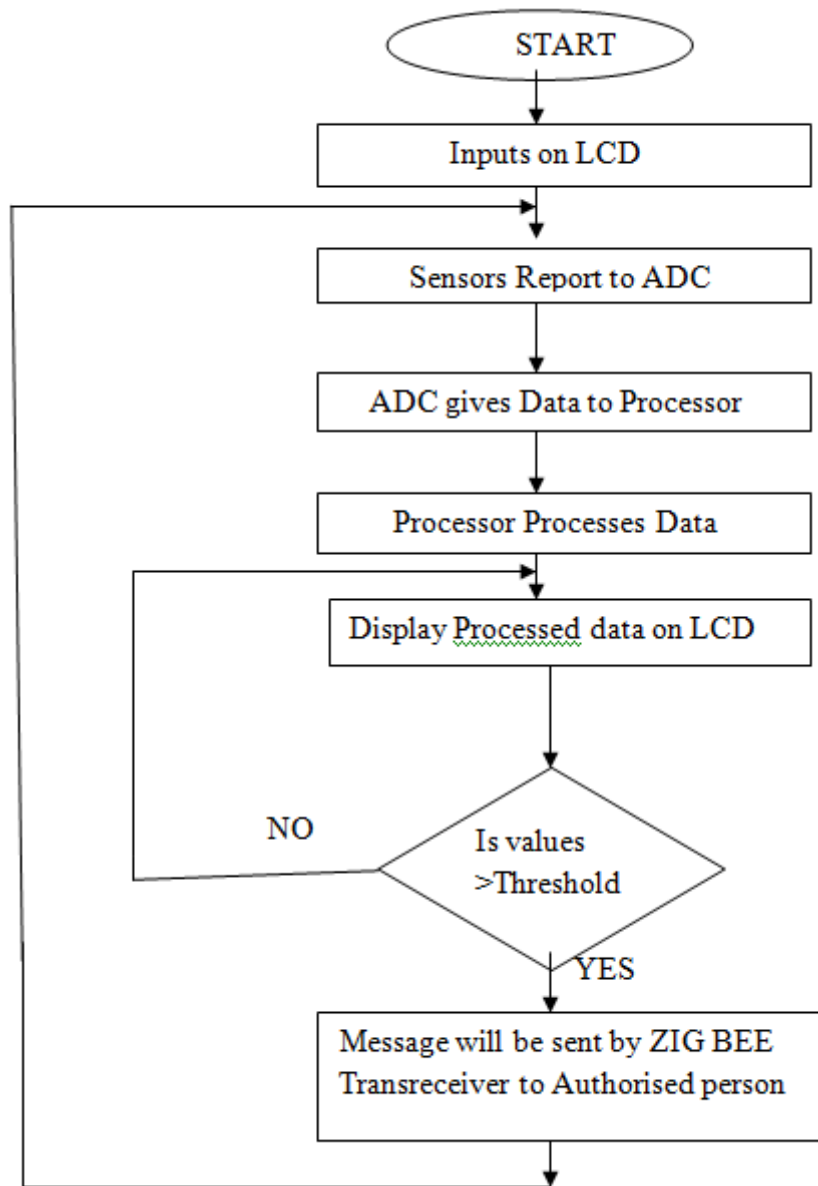

Figure 3: Display the Output

V.   FLOWCHART

Figure 4 : Flowchart

VI.   CONCLUSION AND FUTURE SCOPE

Conclusion
The paper A Smart Helmet for Air Quality and Hazardous Event Detection for the Mining Industry has been successfully designed and tested. Integrating features of all the hardware components used have developed it. Presence of each module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, mistreatment extremely advanced IC's and with the help of growing technology the project has been successfully implemented. As the system requirement and the required components can be easily made available this project can be implemented easily. It will offer the security to coal miners and alter the approach of their operating still as system dominant the varied environmental changes in mines. It has been presented the original design of the low power ZigBee wireless sensor system with an extremely reduced value. It's reliable system with fast and simple installation. The system might be easily extended. With ZigBee wireless positioning devices, It'll improve system quantifiability and extend current position of underground miners in future.

Future Scope:
The system also can be easily extended with ZigBee wireless image transmission facility in future. It will improve measurability of underground atmosphere and extend correct position of miners. In future, with the assistance of Zigbee module and user interface (software part), we are able to avoid railways accidents, road accidents, submarine accidents.

VII.   REFERENCES

[1] Chi Q., Yan H., Zhang C., Pang Z., Xu D.L. A reconfigurable smart sensor interface for industrial WSN in IoT environment. IEEE Trans. Ind. Informat. 2014;10:1417–1425.

[2] Tanmoy Maity, Partha Sarathi Das, Mithu Mukherjee ―A Wireless Surveillance and Safety System for Mine Workers based on Zigbee

[3] R. S. Nutter and M. D. Aldridge, ―Status of mine monitoring and communications,‖ IEEE Trans. on Industry Applications, vol. 24, no. 5, pp. 820-826, Sep./Oct. 1998.

[4] A. D. Kock and J. W. Oberholzer, ―The development and application of electronic technology to increase health, safety, and productivity in the South African coal mining industry,‖ IEEE Trans. on Industry Applications, vol. 33, no. 1, pp. 100-105, Jan/Feb. 1997.

[5] P. Misra, S. Kanhere, D. Ostry and S. Jha, ―Safety assurance and rescue communication systems in high-stress environments: a mining case study‖, IEEE Communications Magazine, vol. 48, no. 4, pp. 66-73, April 2010.

[6] A. E. Forooshani, S. Bashir, D. G. Michelson and S. Noghanian, ―A survey of wireless communications and propagation modelling in underground mines‖, IEEE Communications Surveys and Tutorials, vol. 15, no. 4, pp. 1524-1545, Nov. 2013

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