ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 9, March 2018

A Wireless Surveillance and Safety System for Mine Workers based on zigbee

K.Afsarunnisa[1], Department of ECE, IFET College of Engineering

R.Gomathi[2] ,Department of ECE, IFET College of Engineering

S.Kalpana[3], Department of ECE, IFET College of Engineering

***ABSTRACT*--Industrial safety is one of the main aspects of industry specially mining industry obtains at high altitude (while pointing the area for mining). In the mining industry safety is a very vital factor. To avoid loss of material and damaging of human health, protection system as well as faithful communication system is necessary inside the underground mines. To increase both safety and productivity in mines, a reliable communication must be established between workers, moving in the mine, and a fixed base station. Inside mines, the wired communication system is not so effective and it consists of some physical disturbance. To monitor the Mine parameters like (abnormal heart beat, blood pressure range, worker positioning, harmful gas and high temperature) attacking the Mine workers.And the aim is to avoid those problems in the mining industry and also in high altitude building construction**.

Keywords:
Safety and productivity, Mine parameters, high altitude, Reliable communication.

Introduction:

Excavators additionally risk respiratory harm through the large amounts of tidy and other synthetic particulates show in profound coal mining offices. A portion of the clutters caused by these particulates incorporate COPD, coal specialist's pneumoconiosis (CWP, otherwise called dark lung), and dynamic monstrous fibrosis (PMF)

In this system, the basic parameters like Human heart rate, temperature, humidity and hazardous methane gas are going to be monitored and if any abnormality happen in any of the parameters means it will be intimated in the form of voice within the mine and transmitted to the monitoring section via Zigbee communication module. For that we are having system with Microcontroller, in that the sensors are interfaced with it. The microcontroller was connected with zigbee (transmitter) to send data to the mining system.Then the zigbee (receiver) collects the data and displayed in screen and speaker is used for intimating the abnormal status in voice format and continuous data monitoring in pc server using dot net application.

It is imperative to emerge that to finish a decided assignment requires from around half to 80% additional time at high height than adrift level. High elevation can cause exhaustion and lower efficiency. Additionally, it can build the hazard factors for medical issues and lessen the rest nature of the mining laborers. This last physiological issue can cause daytime tiredness and fretful evenings, expanding the likelihood to endure a work mishap.Drawn out introduction to high elevation has outcomes on the human body. Exceptional changes in working environment, climate and elevation conditions influence specialists' wellbeing, as well as their social conduct, causing dozing clutters and mental dysfunctions which wind up in low execution at work.

A portion of the extreme natural conditions identified with this working area are: low oxygen fixation, low temperature, expanded sunlight based radiation and low relative stickiness. These could have a few

ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 9, March 2018

results. In the first place, hypoxia happens when the measure of oxygen isn't sufficient to cover essential metabolic capacity.This produces changes in the vascular and respiratory frameworks prompting arrhythmia and hyperventilation. These physiological responses can prompt serious pneumonic edema or extreme mind edema, if not treated satisfactorily. Intense Mountain Sickness (AMS) is portrayed by migraine, weariness, breathing issues amid work out, absence of craving, queasiness, spewing, low urinary volume, resting confusion and breathing issue amid rest.

Generally those side effects start following 4 to 8 hours of being at high height, yet now and again they can show up 96 hours after the elevation introduction. The danger of AMS increments with expanding height. Second, low temperature diminishes the work limit. The human body remunerates the low temperature by expanding the vascular and respiratory movement.

To abstain from troubling specialists wearing the T-shirt with detecting installed capacities, the observing framework must be as inconspicuous as could reasonably be expected. This work displays the execution of a social insurance checking framework (equipment and programming) and the exploratory outcomes. The objective of the proposed observing framework is to assess the laborer's wellbeing condition amid the time spent working at high altitude.

This framework permits consistent observing of the wellbeing condition of the client with the goal of giving early restorative help when vital. The inserted sensors demonstrated a viable reaction to exercises that don't require a noteworthy physical exertion.

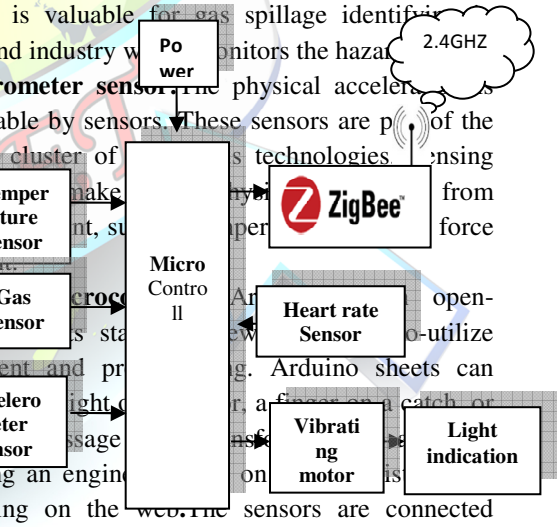
\

ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

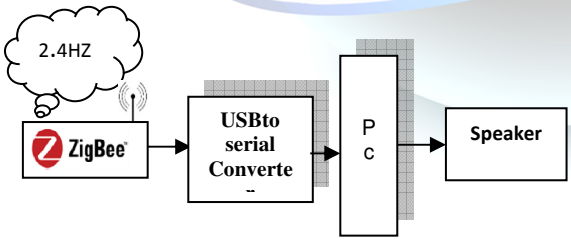
International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 9, March 2018

Block diagram:

MINE SYSTEM:



MONITORING SYSTEM:



System description:

To decide the wellbeing status of a specialist, the framework measures applicable factors utilizing procedures that are insignificantly obtrusive. To get a total outline, the extraordinary states of mine locales at high elevation are likewise estimated by the consolidation of natural sensors. The installed estimated parameters are:

Heart beat sensor:It is intended to give advanced yield of warmth beat when a finger is put on it. At the point when the heart beat indicator is working, the beat LED flashes as one with every heartbeat. This computerized yield can be associated with miniaturized scale controller straightforwardly to quantify the Beats per Minute (BPM) rate of the worker.

Temperature sensor: It measure the measure of warmth vitality or even coldness that is created by a protest or framework, enabling us to "sense" or identify. Any physical change to that temperature delivering either a simple or advanced yield.

Gas sensor: They are touchy for a scope of gasses and are utilized inside at room temperature. The yield is a simple flag and can be perused with a simple contribution of the Arduino. The MQ-2 Gas Sensor module is valuable for gas spillage identifi[illegible] home and industry w[illegible]onitors the hazar[illegible]

Accelerometer sensor: The physical accele[illegible]s measurable by sensors. These sensors are p[illegible] of the sensing cluster of [illegible]s technologies [illegible]nsing tech[illegible]nake[illegible] from the [illegible]nt, su[illegible]per[illegible] force and [illegible]

Arc[illegible]croc[illegible] Ar[illegible] open-sou[illegible]s sta[illegible]ew[illegible]o-utilize equipment and pr[illegible]g. Arduino sheets can re[illegible]ight [illegible]r, a[illegible] a[illegible]ssage [illegible] actuating an engin[illegible]on[illegible] something on the web. The sensors are connected with microcontroller and intimate its data through zigbee.

Zigbee: Its low power utilization limits transmission separations to 10– 100 meters viewable pathway, contingent upon control yield and ecological qualities. Zigbee gadgets can transmit information over long separations by going information through a work system of middle of the road gadgets to achieve more removed one. The T-shirt system has a communication distance of 30-meter radius. The

ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 9, March 2018

information is sent from the zigbee to the base computer using the available wireless communication networks at the mine.

Vibrating motor: When the gas sensor and accelerometer sensor were in abnormal condition it creates a force that translates to vibrations, which intimates the workers to know about the present condition.

USB to TTL convertor: It makes the serial connection between the computer and chip to converts the digital data.

RESULT:

In this system, the basic parameters like Human heart rate, temperature, positioning and hazardous methane gas are going to be monitored and if any abnormality happen in any of the parameters means it will be intimated in the form of voice within the mine and transmitted to the monitoring section via Zigbee communication module. For that we are having system with Microcontroller, in that the sensors are interfaced with it. It is used for intimating the abnormal status in voice format and continuous data monitoring in pc server using dot net application.

The activities evaluated were: lying down, working at a desk, walking, sitting and standing, installing cables with both arms, running at low intensity, jumping, and doing squats. The tests were ordered from lowest to highest physical intensity. The parameters most affected by noise were HR and RR. In the case of the HR, measurements vary between 54-84 beats/min.

CONCLUSION

A wearable observing framework equipped for estimating physiological flags through non-intrusive sensors, ascertain fundamental signs, and decide condition factors was produced. The gadget was executed with remote correspondence between the T-shirt installed sensors and a checking framework based server. This framework permits consistent observing of the wellbeing condition of the client with the goal of giving early restorative help when vital. The inserted sensors demonstrated a viable reaction to exercises that don't require a noteworthy physical exertion.

The major advantage is the workers environment can be monitored anytime and Its response time is higher than other wireless communications.This system can be implemented in Coal and Gold mines.It can also used in narrow caves and high altitude building construction.

Prototype of complete system used by a worker under a safety jacket

REFERENCES

[1]Monitoring Physiological Variables of Mining Workers at High Altitude Pablo Aqueveque1, Member, IEEE, Christopher Gutierrez1, Francisco Saavedra1, Student Member, IEEE, Esteban J. Pino1, Senior Member, IEEE, Anibal S. Morales2, Member, IEEE and Eduardo Wiechmann1, Senior Member, IEEE,

ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 9, March 2018

[2] B. Siliverstovs, D. Herzer, "Manufacturing exports, mining exports and growth: conintegration and causality analysis for Chile (1960 – 2001)", Applied Economics, 2007, pp. 153–167.

[3] "Annual Report of Chilean Mining 2014", National Service of Geology and mining, Chile. ISSN: 0066-5096, 2014.

[4] D. Jimenez, "High altitude intermittent chronic exposure: Andean miners", Hypoxia and the Brain, 1995, pp.284-91.

[5] H.-Y. Chiu, "Early morning awakening and nonrestorative sleep are associated with increased minor non-fatal accidents during work and leisure time", Accid. Anal. Prev., vol. 71C, pp. 10-14, 2014.

[6] EJ Pino, A Dorner De la Paz, P Aqueveque, "Noninvasive monitoring device to evaluate sleep quality at mining facilities", IEEE Transactions on Industry Applications, 51 (1), pp.101-108, 2015

[7]S. Z. Bian, J. H. Zhang , X. B. Gao, M. Li, J. Yu, X. Liu, L. Huang, "Risk factors for high-altitude headache upon acute high-altitude exposure at 3700 m in young Chinese men: a cohort study", The Journal of Headache Pain, 2013,pp. 35.

[8] J. B. West, "Oxygen enrichment of room air to improve well-being and productivity at high altitude", International journal of occupational and environmental health, 1999,pp. 187-193.

[9] P. Cerretelli, "Gas exchange at high altitude", Pulmonary Gas Exchange vol. 2, 1980, pp.97-147.

[10] B. M. Koeppen, B. A. Satanton, Berne y Levy "Fisiología", vol. ED-6, 2009, pp. 454.

[11] D. R. Woods, S. Allen, T. R. Betts, D. Gardiner, H. Montgomery,J. M. Morgan, P. R. Roberts, "High altitude arrhythmias", Cardiology, 2008,pp. 239-246.

[12] H. Chiodi, "Respiratory adaptations to chronic high altitude hypoxia", Journal of Applied Physiology, 1957, pp. 81-87.

[13] B. Basnyat,"High-altitude emergency medicine",Lancet,2000, pp.356.

[14] P.H. Hackett, R.C. Roach, "High Altitude Cerebral Edema", High Altitude Medicine & Biology, 2004, pp. 136-146.

[15] M. Vargas, J. Osorio, D. Jiménez, F. Moraga, M. Sepúlveda, J. Del Solar, A. León, "Acute mountain sickness at 3500 and 4250, vol. 129, no. 2, 2001, pp.166-172.