IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 3, March 2021

DOI 10.17148/IJIREEICE.2021.9320

GOLD MINING AND GOLD ORING USING VLC

Maheswari.R[1], Subhasree.P.S[2], Vaishnavi.P[3] , Matheshwaraan.K[4]

Assistant Professor, Department of ECE, Agni College of Technology Chennai, Tamilnadu, India[1]

UG Student, Department of ECE, Agni College of Technology Chennai, Tamilnadu, India[2-4]

Abstract: Gold mining and Oring involves the science, technology, and business of the discovery of gold, in addition to its removal and sale in the marketplace. This Mining and ring process involves many issues and hazards to the workers of the mines. The health of the workers in the mines were affected by inhaling dust and toxic gas in the Gold mining environment. In this project we've come up with an idea to overcome the above problems. The blood oxygen level of the workers is continuously monitored by using Pulse OxiMeter and detects the abnormalities in pulse, so that the workers are under monitoring and any issues in health can be detected immediately. The emission of toxic gas is detected by a CH4 sensor which is used to detect methane gas, and dilutes the gas so that it won't affect the workers. The toxic gas is diluted by using an exhaust fan which is attached to our set up.

Keywords: VLC, LED, LDR, pH sensor , Pulse Oximeter and Data Transfer through Light

I.INTRODUCTION

Gold mines are used to extract gold from underground which is used worldwide as an asset. But this process involves lots of issues and danger to the people working there. Such issues are emission of toxic gas, slips, rock falls, and many health hazards that workers face like lack of oxygen, abnormality in pulse and many more. To overcome some of these issues, we've come up with an idea. Our project helps in monitoring the workers health spontaneously so that worker's health can be saved in many dangerous situations. The worker's pulse and oxygen level are monitored by using a pulse oximeter whose data is transmitted using VLC. The data is transmitted through VLC technology . The VLC kit involves a LED and LDR. The receiver side is set in the oring section or the control room. Such that the officials in the control room can monitor the worker's condition and the workers who are in danger can be saved or rescued immediately. Another hazardous thing that happens in mine is emission of toxic gas. Our setup consists of a CH4 sensor which is used to detect the toxic gas emitted. The gas that emitted is detected and it can be sucked out using Exhaust fan. Thus the dilution of gas takes place to avoid health effects and danger to the lives of the workers. On the Oring side, a PH meter is placed to detect the cyanide and that can be converted to cyanate.

OBSERVATION OF THE STUDY:

At present, the day to day activities use a lot of LED based lights for illumination, which can also be used for communication because of the advantages like fast switching, high power efficiency and safety to human vision. Hence, this project presents eco-friendly data and video communication through visible light which consists of the white LEDs that transmit audio signals to the receiver. The receiver circuit consists of a solar panel connected with the amplifier and speakers to recover back the amplified version of the original input signal.

II.REVIEW OF LITERATURE

2.1 INTEGRATED SYSTEM OF WHITE LED VISIBLE-LIGHT COMMUNICATION AND POWER-LINE COMMUNICATION

White LED offers advantageous properties such as high brightness, reliability, lower power consumption and long lifetime. Indoor optical wireless communication systems employing white LED lighting have been proposed. This system will enable high quality of service by the high radiation power from this lighting equipment. And, this system does not cause or suffer from radio or electromagnetic interference. But, it is difficult for existing offers and households to install the communication cable to the ceiling. In this paper, an easy wiring system for optical communication using existing power-line is proposed. This system is emitted as visible-light from LED lighting according to the transmitted signal waveform without demodulating a signal from the power-line. This system is expected to be applicable from the existing illuminant easily like exchanging electric bulbs. This integrated system will surely have a big impact as a new signal transmission system and its economical effect will be great. The basic performance of this system is analyzed. The actual system is built and its feasibility is shown through experiments.

IJIREEICE
ISSN (Online) 2321-2004
ISSN (Print) 2321-5526
International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering
Vol. 9, Issue 3, March 2021
DOI 10.17148/IJIREEICE.2021.9320

2.2 VISIBLE LIGHT COMMUNICATION: OPPORTUNITIES, CHALLENGES AND CHANNEL MODELS

Recent advancements in Solid State Lighting (SSL) have triggered research in the domain of Visible Light Communication (VLC) which enables us to use Light Emitting Diodes (LEDs) for illumination as well as low cost, high speed, power efficient and secure data communication. VLC technology is considered to be a green technology which helps in the reduction of hazardous gases emission. This paper presents a thorough survey on recent advancements in the domain of VLC starting from its emergence to the channel modelling.

2.3 SIMULTANEOUS RECEPTION OF VISIBLE LIGHT COMMUNICATION AND OPTICAL ENERGY USING A SOLAR CELL RECEIVER

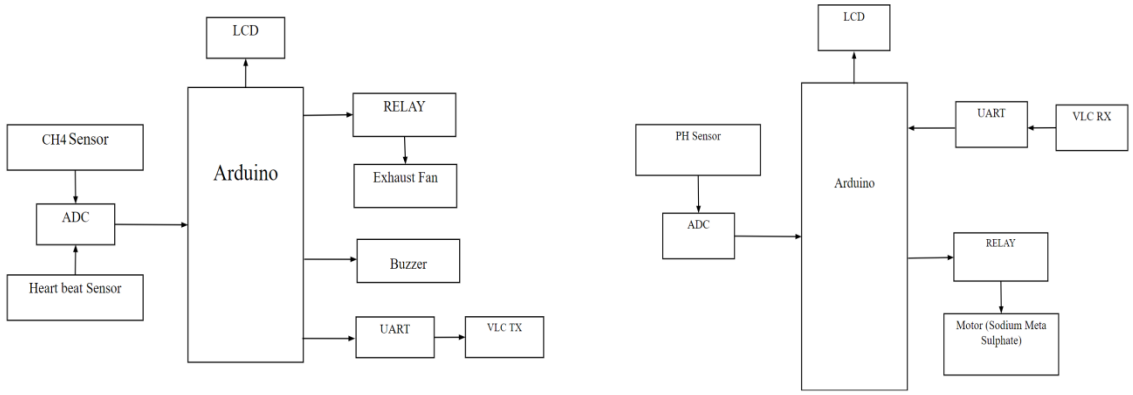
We propose and demonstrate a technique to use a solar cell as a simultaneous receiver of visible light communication (VLC) and optical energy. We investigate the characteristic of a solar cell and demonstrate that a solar cell can receive low-frequency VLC signals and optical energy from sunlight simultaneously. We also investigate the effect of sunlight interference on the VLC performance. By using these results, a VLC using a solar cell as a receiver can be implemented without a photodiode receiver and power supplies. This technique enables us to implement an eco-friendly VLC system.

2.4 THE COMPARISON OF EXPERIMENTAL AND ANALYTICAL STUDY OF THE GAUSSIAN INTENSITY DISTRIBUTION FOR LIGHT EMITTING DIODES BEAM

Wireless communication using white Light Emitting Diodes (LEDs) is the latest research field for next-generation communication. This study studies the comparison of Gaussian intensity distribution of the white LED using experimental and analytical methods. The white LEDs are conducted to transmit an audio signal to the receiver. The receiver circuit consists of a solar cell connected to the speaker to recover the audio signal. From the comparison of experimental and analytical data, the Gaussian plot of experimental data is steeper than the analytical data, meaning that the LED has a small-divergence beam. Conclusion/Recommendations: The output voltage of experimental works decreases exponentially with the distance while the Full Width Half Maximum (FWHM) value increases exponentially with the distance. The gradual increment and decrement of the analytical signal can be applicable to visible light communication implementation as such light sources can cover a wide area for signal transmission.

III. PRELIMINERIES :

3.1 Block Diagram of the Proposed System:



TRANSMITTER **RECEIVER**

Our proposed work is to provide a safety system for Gold Mining persons using Wireless Communication. The main components of this communication system are high brightness white LED, Which acts as a communication source and silicon photodiode which shows good response to visible wavelength regions serving as the receiving element. Here CH4 sensor is used to sense the level of methane gas present in the mine and to intimate the officials about the presence of hazardous gas. If so found it can be indicated by an alarm and if the level exceeds it can be exhausted by use of an exhaust fan. The Heart beat sensor is used to monitor the heartbeat of the worker and these datas are transmitted to the monitoring section through ZIGBEE. In the gold oring process the toxic level is sensed by pH sensor and displayed in the LCD and if the toxic level exceeds the threshold value the Sodium Meta Sulphate solvent is sprayed over the area to neutralize the toxic level. The obtained data is transmitted by the visible light and received by the photodetector at the receiver end. The above work is done to enhance the safety for the mining workers.

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

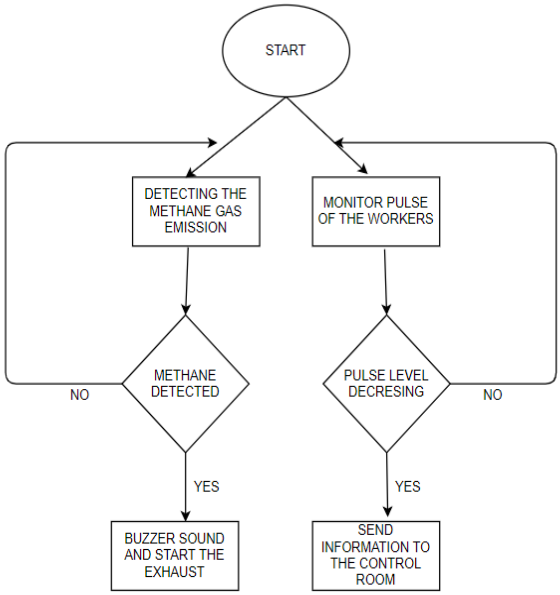
International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 3, March 2021

DOI 10.17148/IJIREEICE.2021.9320

3.2 Flow chart of the Proposed System :

The Flow diagram represents the proposed system working , the Heart beat sensor is used to monitor the heartbeat of the worker and these data are transmitted to the monitoring section through ZIGBEE. In the gold oring process the toxic level is sensed by pH sensor and displayed in the LCD and if the toxic level exceeds the threshold value the Sodium Meta Sulphate solvent is sprayed over the area to neutralize the toxic level.



IV.RESULT OF THE STUDY:

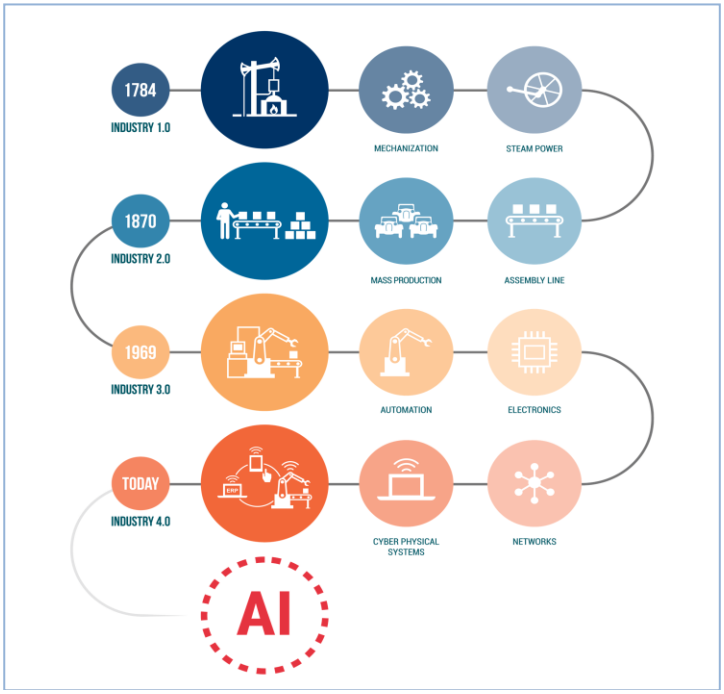


Fig. 1 A sample figure

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 3, March 2021

DOI 10.17148/IJIREEICE.2021.9320

V.ADVANTAGES :

Visible light should be considered as the medium for wireless transmission because it has a few advantages over other standard wireless transmissions. The first reason to consider is visible light's frequency spectrum bandwidth, which ranges from 430 THz to 750 THz [11]. The bandwidth is much larger than the radio frequency bandwidth, which ranges from 3 kHz to 300 GHz [1]. If the communication system will be used in hospitals, the transmissions will not occur in the Industrial, Scientific, and Medical (ISM) band, therefore not interfering with medical devices. The next major advantage that visible light systems have over other communication systems is its abundance. On typical work days, company buildings, restaurants, grocery stores, etc. will have lights on for at least the duration of hours of operation, of which could be used for visible light communications. Visible light was chosen for a variety of reasons, but primarily because it will not add to the cluttering of the radio frequency spectrum, which is heavily regulated by the FCC, and also because it will avoid the issue of interference in sensitive settings such as hospitals and airplanes. Figure 4 shows the wavelength range of visible light.

VI. CONCLUSION:

Thus the Visible Light Communication based technology monitors the Workers health and updates the data spontaneously. Thus, the system manages to save the worker in danger. As Visible Light Communication technology is used for data transmission and reception, energy consumption is also considered to be less. The system is simple, consumes less power and reduces wireless interference. This report is divided into Six chapters. First chapter gives an introduction of our project with its benefits and disadvantages. Second chapter gives a Literature Survey of our project with Merits and Demerits. Third chapter explains Working of the project with objectives and Proposed system. Fourth chapter gives the introduction of the hardware implementation. Fifth chapter gives the introduction of software implementation being used in our project and finally the Sixth chapter explains in detail the work done by us with Experimental results

"Our Software and hardware implementation are both successful and through this we can say that this system is purely a realisable concept and the future will be surely headed towards it."

REFERENCES

[1].Underground Mine Communications: A Survey Serhan Yarkan, Sabih G¨uzelg¨oz, H¨useyin Arslan, and Robin R. Murphy
[2].Occupational health hazards in mining: an overview M. Donoghue
[3].NVisionIP: NetFlow Visualizations of System State for Security Situational Awareness Kiran Lakkaraju, William Yurcik and Adam J. Lee
[4].Microblogging During Two Natural Hazards Events: What Twitter May Contribute to Situational Awareness Sarah Vieweg, Amanda L. Hughes, Kate Starbird & Leysia Palen analyzed
[5].Cooperative Forest Fire Surveillance Using a Team of Small Unmanned Air Vehicles David W. Casbeer, Derek B. Kingston, Randal W. Beard, Timothy W. McLain Sai-Ming Li, Raman Mehra