



WIRELESS HEALTH MONITORING SYSTEM USING LIFI COMMUNATION

Dr. D. Thamaraiselvi ¹, T. Giridhar Reddy ², R. Yaswanth ³

¹ Assistant Professor, Department of CSE, SCSVMV
Kanchipuram, Tamil Nadu, India

^{2, 3} UG Student, Department of CSE, SCSVMV
Kanchipuram, Tamil Nadu, India

Abstract— Visible light Dispatches(VLC) is an arising and promising conception that's able of working the major challenges of 5G and Internet of effects(IoT) communication systems. also, due to the operation of light- emitting diodes(LEDs) in nearly every aspect of our diurnal life VLC is furnishing massive connectivity for colorful types of massive IoT dispatches ranging from machine- to - vehicle, chip- to- chip as well as device- todevice. In this paper, we take over a comprehensive review of the prospects of enforcing VLC for IoT. also, we probe being and proposed approaches enforced in the operation of VLC for IoT. also, we look at the challenges faced in applying VLC for IoT and offer results where applicable. also, we identify unborn exploration directions in the perpetration of VLC for IoT. For this design we propose using two sets of receivers and transmitters, the set of transmitters will use a broadband LED and the other using an IR LED. The receivers will have the capability to not circumscribe the inflow of the data, or have analogous response times to the LED itself.

Keywords— Internet of things (IOT), Arduino Uno (2), GSM Module, DS18B20, Temperature sensor, Heart beat sensor.

I. INTRODUCTION

Li- Fi technology is veritably analogous to Wi- Fi technology in the sense that it's a original wireless network, still the signal is visible light rather of in the radio frequentness. Since visible light frequency is much advanced on the EM diapason Li- Fi

systems give bandwidth numerous times lesser than Wi- Fi. In addition Li- Fi is vastly further energy effective, since the transmitter in the system is an LED rather of a conventional radio transmitter. Li- Fi is also a secure means of data transfer, the modulating light itself represents the data sluice, and since light doesn't access walls there's no way to ever block the data. Our system will also be full duplex unlike VLC systems that are only one- way dispatches. Li- Fi systems arenon-hazardous to other electrical systems in terms of hindrance, making them more protean in settings like a aeroplanes

or settings with high perceptivity to electromagnetic radiation. Light emitting diode(LED) light bulbs not only can give energy effectiveness in illuminating houses, and stores, but have the capability to modulate with colorful schemes similar as palpitation range modulation(PWM) and or palpitation position modulation(PPM). likewise, ways similar as orthogonal frequency division multiplexing can be enforced to allow for access to multiple druggies from one transmitting network. This design will concentrate on enforcing a connection from an ethernet harborage into a intensity modulation format for the LED. As the internet of effects(IoT) continues to evolve, the colorful bias in the home will bear connectivity. This rate of increase is going to impact the capability of our wireless transmitting bias to carry that bandwidth which is where LiFi can be operation specific and not be for consumer use. likewise, the IoT has operations similar as theme premises where at each station or lift can have

independent data be transmitted to a multimedia device for the consumer similar as in stoked reality. The LiFi systems overall is cost effective because of power consumption, and it should be similar to a WiFi module, and can be delved to apply with PoE and produce new operations assiduity can take advantage.

II. Literature Survey

They studied the design of Li- Fi as a new wireless technology which works in furnishing connectivity within a prescribed network terrain. The working of this technology is veritably unique Because It provides transfer of data by transferring information through an LED that varies in intensity so presto that the mortal eye can not follow. Haas's invention, DLIGHT could produce data rates further than 10 Mb/ s, which is faster than an average broadband connection. Eventually, the authors have prognosticated the brighter future compass of this technology for using visible light as a transporter in data transfer and networking. Li- Fi technology may not be so effective in order to replace old-nominated radios altogether, but it could give a rapid-fire drive to the development of bias like wireless TV and the authors discovered a big disadvantage of Wi- Fi is that chancing the ideal position for the placement of a wireless router from where it could cover the asked area. Some of the advantages of Wi- Fi bandied by the authors are its convenience, its mobility, numerous guests can be given accessetc. In this paper, a visible light communication(VLC) system for inner Internet of effects(IoT) operations, called VLCIoT, is proposed. The proposed system is grounded on type I of the IEEE802.15.7 standard physical(PHY) subcaste. The PHY I is handed for low data rate operations from 10 to 100 kb/ s, which looks suitable for the typical IoT operations. The on- off conciliating suggested modulation scheme by the PHY I that's simple and requires low- cost tackle for perpetration is considered. The enforced VLCIoT system is robust against inner ambient light hindrance. Using the frequence division multiple access, several VLC networks can operate at different frequentness in the vicinity of each other without hindrance. The data rate of VLCIoT is over to 115.2 kb/ s, and the bit error rate of the system is veritably low. This system is designed for inner, which for this purpose operates well up to 7 m distances.

• Hind Bangui et al; title “ Smart Mobile Technologies for the City of the unborn presented, the Smart City conception is gaining fashionability due to involving colorful technologies in public places in order to satisfy the citizens' requirements. still, the success of the smart megacity paradigm is linked to the treatment and operation of the quantum of real time data, which can be at the moment most effectively approached with the help of pall platforms. In this paper, they agitating the most promising mobile pall and data transmission technologies that are anticipated to make the megacity more “ smart ” and more affordable for the end- druggies. Hence, they also bandy Li- Fi as a unborn transmission of data through illumination that can enhance further the communication in a smart megacity as well as guarantee a wireless connectivity that meets the conditions of the citizens.

• P.Kuppusamy et al; title “ Survey and Challenges of Li- Fi with Comparison of Wi- Fi ” presented a check on Wi- Fi technology in marketable and diligence and Li- Fi technology. Wi- Fi is working grounded on radio swells in the diapason. These swells are veritably dangerous to the diseased people, signal sensitive areas. Hence it couldn't be employed in surroundings similar as hospitals, checkup centers, air lines etc. To overcome these limitations, Li- Fi is the technology that's developed to work in similar surroundings. This paper is presented the study of Li- Fi technology, working principles, challenges and operations with comparison of Wi- Fi technology. The relative study is also presented the features of both technologies. The compliances show that Li- Fi performs inoffensive data transmission at high speed using light source. Android Grounded Body Area Network for the Evaluation of Medical Parameters.

• There Are colorful Vital Parameters In This System. They Are ECG, Heart Rate, Heart Rate Variability, Pulse Oximetry, Plethysmography And Fall Discovery.

• The Tele- medical System Is the System Which Focuses on the System Which Focuses on the dimension and Evaluation of These Vital Parameters. In a Android Smartphones There Are Two Different Contrivers Of A(Wireless) Body Networks The Real Time System Features Several Capabilities. Data Acquisition In The(W) Ban Plus The Use Of The Smartphone Sensors, Data

Transmission And Emergency Communication With First Responders And Clinical Garçon.

• It Is veritably Important To Smart And Energy Effective Detectors. This Can Be Compensated. In The First ZigBee Based Approach, Sensor Nodes Acquire Physiological Parameter Perform Signal Processing and Data Analysis and Transmit dimension Value to the fellow knot. Detectors Are Connected Via Cable to an Bedded System In The Alternate Deign. In The Both Types Of System, Bluetooth Is habituated For Transferring The Data To An Android Grounded Smartphone.

III. Existing System

Preliminarily we were transmitting data using WIFI. In moment world communication between the bias is important common. These bias are using radio swells for short range wireless transmissions. Wi- Fi and Bluetooth are presently the two prominent short range wireless technologies. The radio surge diapason has certain crucial limitations which include bandwidth consumption, effectiveness, vacuity, and security. We were transmitting data using WI- FI, but LIFI is more accessible and briskly. It takes further time to transmit the data. Being system downsides.

- In radio surge diapason data transmission security is veritably less.
- Lot of data can not be transferred simultaneo usly.
- Bandwidth operation is limited.

IV. Proposed System

In the proposed system we use two Arduino controllers one is acts as Transmitter which is connected to LIFI Transmitter and another one is acts as Receiver which is connected to LIFI receiver. For the transmitter we are connecting heartbeat sensor and temperature sensor. Heart beat sensor will measure the heart rate and temperature sensor will detect the temperature of the body. Respiratory is used to measure the breath rate of a person. Whenever these values go abnormal TX will send the signals to the RX. For the RX we are connecting GSM module to send message to caretaker or to parents. So, the GSM will send message whenever the person detects as abnormal and then the data will display on LCD. In TX there is emergency switch also interfaced whenever the person fell ill, they can press switch it will send message to the caretaker.

V. Methodology

Most of the people are using Wi- Fi Internet bias, which will be useful for 2.45 GHz RF to delivery wireless Internet access girdled our home, services, seminaries and some public places also. We're relatively dependent upon these nearly ubiquitous services. thus, RF grounded technologies similar as moments Wi- Fi aren't the optimal way. In addition, Wi- Fi may not be the most effective way to give new asked capabilities similar as perfection inner positioning and gesture recognition. The optic wireless technologies, occasionally called visible light communication and more lately appertained to as Li- Fi.

A. Architecture: -

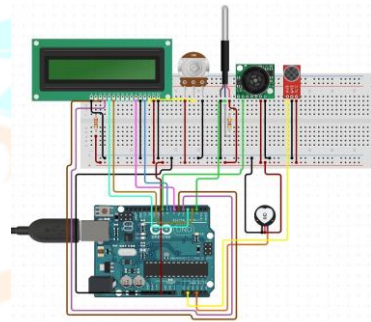


Fig 1.a Hardware block diagram (Transmitter)

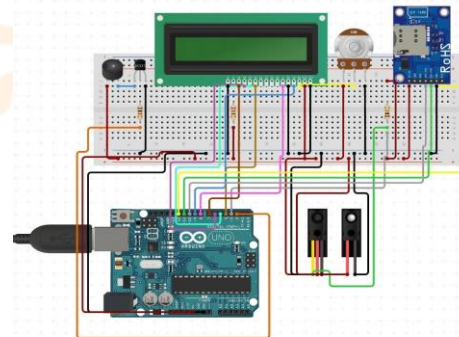


Fig 1.b Hardware Block Diagram (Receiver)

B. Hardware Description

Arduino - Arduino is an open-source electrical platform that is simple to use and put into practice. It is built on the link between hardware and software. They are built such that they can read when the water exceeds a specific threshold and transform that information into an alert when it does.

Fig 2. Arduino board



Heartbeat Sensor is an electronic device that is used to measure the heart rate i.e., speed of the heartbeat. Monitoring body temperature, heart rate and blood pressure are the basic things that we do to keep us healthy. To measure the body temperature, we use thermometers and a sphygmomanometer to monitor the Arterial Pressure or Blood Pressure. Heart Rate can be monitored in two ways: one way is to manually check the pulse either at wrists or neck and the other way is to use a Heartbeat Sensor. Heartbeat Sensors are available in Wrist Watches (Smart Watches), Smart Phones, chest straps, etc. The heartbeat is measured in beats per minute or bpm, which indicates the number of times the heart is contracting or expanding in a minute.

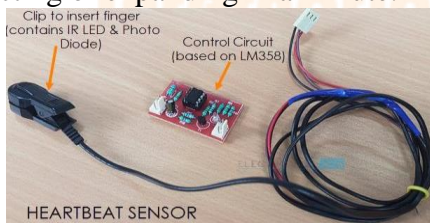


Fig 3. Heartbeat Sensor

The digital temperature detector like DS18B20 follows single line protocol and it can be used to measure temperature in the range of -67 oF to 257 oF or -55 oC to 125 oC with 5 delicacy. The range of entered data from the 1- line can range from 9- bit to 12- bit. Because, this detector follows the single line protocol, and the controlling of this can be done through an only leg of Microcontroller. This is an advanced position protocol, where each detector can be set with a 64- bit periodical law which aids to control multitudinous detectors using a single leg of the microcontroller. This composition discusses an overview of a DS18B20 temperature detector. The DS18B20 is one type of temperature

detector and it supplies 9- bit to 12- bit readings of temperature. These values show the temperature of a particular device. The communication of this detector can be done through a one- line machine protocol which uses one data line to communicate with an inner microprocessor. also, this detector gets the power force directly from the data line so that the need for an external power force can be excluded. The operations of the DS18B20 temperature detector include artificial systems, consumer products, systems which are sensitive thermally, thermostatic controls, and thermometers.

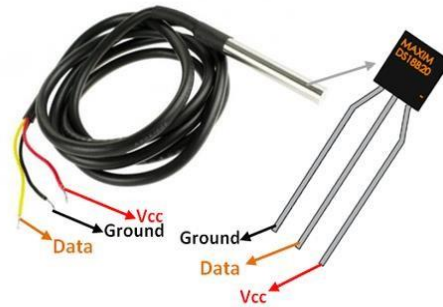


Fig 4. DS18B20 Temperature Sensor

Sound Sensor:- A sound sensor is defined as a module that detects sound waves through its intensity and converting it to electrical signals. sound sensor consists of an in-built capacitive microphone, peak detector, and an amplifier (LM386, LM393, etc.) that's highly sensitive to sound.



Fig 5. SOUND SENSOR

Li-Fi (also written as LiFi) is a wireless communication technology which utilizes light to transmit data and position between bias. The term was first introduced by Harald Haas during a 2011 TEDGlobal talk in Edinburgh. In terms of its end use, the technology is analogous to Wi-Fi- the crucial specialized difference being that Wi-Fi uses radio frequency to induce a voltage in an antenna to transmit data, whereas Li-Fi uses the modulation of light intensity to transmit data. LiFi can theoretically

transmit at pets Li- Fi can be also called optic Wi- Fi since it uses visible light for the transmission of data unlike Wi- Fi that uses radio swells. Due to low cost and vacuity of LEDs, we can use the Li- Fi technology for attaining a lesser speed in all the places,e.g. It can be used in the headlight of buses to admit data so that accidents don't do, it can be used in our houses to pierce data at a veritably high speed, it can be used in aquatic transmission,etc.of up to 100 Gbit/s. Li- Fi's capability to safely serve in areas else susceptible to electromagnetic hindrance.



Fig 6. LI-FI COMMUNATION MODULE

LCD (Liquid Crystal Display) is the TV(Liquid Crystal Display) is the invention employed in scrape pad shows and other littler PCs. Like invention for light- producing diode(LED) and gas- tube, LCDs permit donations to be a l ot more slender than invention for cathode ray tube(CRT). LCDs expend vastly lower power than LED shows and gas shows since they work as opposed to expiring it on the guideline of blocking light. A TV is either made with a uninvolved chassis or a show network for dynamic frame show. Likewise indicated to as a stingy film transistor(TFT) show



is the dynamic frame TV. The uninvolved TV chassis has a matrix of operators at every crossing point of the network with pixels. Two operators on the chassis shoot a current to control the light for any pixel. A performing frame has a transistor

positioned at every pixel crossing point, taking lower current to control the luminance of a pixel.

Fig 7. 16x2 I2C LCD Display

Some frosty network TV's have double filtering, which implies they examine the matrix doubly.

Some aloof network LCD's have double filtering, which implies they examine the matrix twice with current in the meantime as the first innovation took one sweep. Dynamic lattice, be that as it may, is as yet a higher innovation.

Buzzer- A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric.



Fig 8. Buzzer

C. Software requirements

Arduino IDE where IDE stands for Coordinates Improvement Environment – An official computer program presented by Arduino. cc, that's utilized for composing, compiling, and uploading the code within the Arduino Gadget. Nearly all Arduino modules are consistent with this computer program that's open source and is promptly accessible to introduce and begin compiling the code on the go.

VI. WORKING

As appears in figure 9 this framework is utilizing an Arduino board. This circuit is comprised of several pieces of equipment

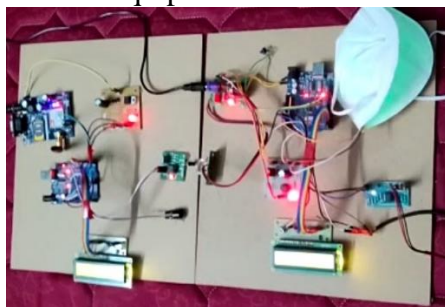


Fig 9. Full Board

components which incorporate of Arduino board, ir receiver, GSM, buzzer, LCD, Power supply board, and some jumper wires as an association for the entire circuit.

There are two types of boards in the project the first one transmitter and another one is receiver board. Here in the transmitter board temperature, BMP, Respirator sensors are connected to arduino and also display is connected to get the digital values. All sensors values are measured and send to arduino and the arduino will transmit the measured values to receiver through the light emitting diode.

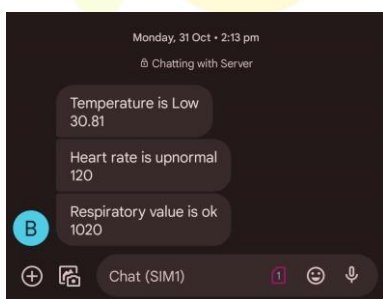
The transmitted data is received using photo diode and reads the data by arduino and displayed in the receiver board.

VII. EXPERIMENTAL RESULTS



In this experiment we implemented threshold limit so if any values are wrong or else something happend to the patient the sms will alert the doctors immediately you can see the sms alert in fig 16.

Fig 16. SMS Alert



CONCLUSION

In this design we've concluded that Li- Fi Communication System is briskly to transmit the data and unbackable by nonnatives. Li- Fi replaces

the Wi- Fi. Li- Fi can be used in varies field. Use of Li- Fi in audio & Text transmission can ameliorate the speed of communication and speed of device robotization in varies fields. Li- Fi can be used in varies areas where frequentness can be confined. The textbook transmission becomes secured due to use of Li- Fi technology. we've bandied the visible light communication network, its history and operations. The being literature is reviewed for the uplink transmission. presently, utmost of the exploration work is concentrated on the downlink to present a strong argument to the exploration community about the eventuality of VLC regarding operations and high data rate. utmost of the being exploration have used RF and IR for the uplink. PLC is substantially used as a backbone in the access network. We stressed the limitation of these uplink technologies. To efficiently use the vast bandwidth of visible light diapason, a complete system-position evaluation is needed. This evaluation should consider the limitation due to uplink and backbone.

ACKNOWLEDGMENT

We express our deep gratitude to our project guide Dr. D. Thamaraiselvi; under whose valuable guidance the whole work is carried out

REFERENCES

- [1] Mahendran, R., 2016, May. Integrated Li-Fi (Light Fidelity) for smart communication through illumination. In Advanced Communication Control and Computing Technologies (ICACCCT), 2016 International Conference on (pp. 53-56). IEEE. He presented the methodology of sending image from one system to another using Li-Fi technology.
- [2] H. Haas and N. Serafimovski, "Li-Fi unlocking unprecedented wireless pathways for our digital future," IEEE ComSoc Technology News, Dec. 2016.
- [3] In November 2016, IEEE has formed a Topic Interest Group (TIG) to start activities of LiFi standardization within the IEEE wireless LAN Standard P802.11. The group is lead by pureLiFi and has many supporting institutions (a non exhaustive list includes Cisco, LG Electronics, Lucibel, Schneider, Nokia, Boeing, Hewlett Packard, and Fraunhofer).
- [4] Chakraborty, Anwesa & Dutta, Trina & Mondal, Sushmita & Nath, Asoke. (2018). Latest advancement in Light Fidelity (Li-Fi) Technology. International Journal of Advance Research in Computer Science and Management Studies. 5. 47- 53.
- [5] Kavyashree. A , H. C. Srinivasaiah , Kavyashree. A, H. C. Srinivasaiah " Data Transmission And Device Control Using Li-Fi " , International Journal of Industrial Electronics and Electrical Engineering (IJIEEE) , Special Issue (2016) (Sep, 2016)
- [6] S. Rajagopal, R. Roberts and S.K. Lim, "IEEE 802.15.7 visible light communication: Modulation schemes

and dimming support”, IEEE Commun. Mag., Vol. 50, no.3, pp. 72-82, 2012
[7] S. Rajbhandari, H. Chun, G. Faulkner, K. Cameron, A. V. N. Jalajakumari, R. Henderson, D. Tsonev, M. Ijaz, Z. Chen, H. Haas, E. Xie, J. J. D. McKendry, J. Herrnsdorf, E. Gu,

M. D. Dawson and D. O’Brien, "High-speed integrated visible light communication system: Device constraints and design considerations", IEEE J. Sel. Areas Commun., vol. 33, no. 9, pp. 1750-1757, 2015.

