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# Smart Health Monitoring System Using LIFI Technology

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**ABSTRACT:** This paper illustrates the patient monitoring system using Li-Fi technology. Li-Fi stands for Light Fidelity. Li-Fi technology proposed by the German Physicist Harold Haas, provides transmission of data through illumination by sending data through varies intensity faster than human eye can follow. Li-Fi is a bidirectional, high speed and fully networked wireless optical communication and is a form of visible light communication. The proposed model helps in the patient monitoring in the hospitals and can be done by using the concept of Li-fi instead of Wi-Fi technology to avoid the frequency interference with the human body. We are using sensor like heart beat sensor for monitoring child heart beat level, temperature is used to monitor child body temperature, All these parameters are stored in Arduino microcontroller and then it will be uploaded and Receiver receive a data from LI-FI transmitter and it will monitored by PC and IOT server and a emergency SMS sent doctor in case of emergency IOT server monitored or SMS sent to doctor he will prevent the treatment for the particular child and also emergency, message sent to his parents or relatives. .In this way efficient to monitor child incubator real-time.

## I. INTRODUCTION

INTRODUCTION In the era of emerging technology, it is necessary to find better solutions for every activity. Nowadays health care expenses are increasing and to reduce this expenses it is required to have a technology based health care systems. Patient monitoring can be done in a very efficient manner using the Li-Fi technology. Patient monitoring refers to “repeated or continuous observations or measurements of the patient, his/her physiological function, and the function of life support equipment, for the purpose of guiding management decisions, including when to make therapeutics interventions, and assessment of those intervention” (Hudson, 1985.). Patient monitoring done by the Wi-Fi is slower when compared to the Li-Fi and it also has less bandwidth. Reliability is better in Li-Fi than Wi-Fi. Since transmission of data by Wi-Fi is through RF waves, there is a high possibility that these waves might affect the human body. The designation of these signals may be carcinogenic and this has been given by the World Health Organization. To solve this problem, Li-Fi (light fidelity) technology is used for healthy environment. Light fidelity is transmission of information through optical wireless medium. Sensors such as heart beat, temperature, and motion sensor are used transmitted through the Li-Fi module. Rapid pulses are generated in the form of 0s and 1s. Photo diode is used at the receiver end. Flickering of light takes place at the rate of hundreds of megabits per seconds. By using Bluetooth, the receiver is connected to mobile. The information received in the mobile can be displayed in the mobile through an application. The range of the Li-Fi technology is 10m and secured communication is possible. The transmission of information by light through wireless is termed as Visible Light Communication (VLC).

In this 20th century there is a drastic change InTechnology as well and also in the field of wireless networks and automation which seems to be huge wave before decades. Internet has grown everywhere to access the services and smart things from anywhere on anytime at anyplace. In this internet of things (IOT) is playing an immense role in the field of automation and wireless technology for a decades. The Internet of Things (IOT) can fully exploit the potential of networking and alter the device of innovative services to over-scale scenarios such as home automation, building automation, intelligent cities and healthcare. For using technology the healthcare monitoring is important for saving patient life. For this purpose our projects is smart to way monitor patient health. In Our Project LI-FI Technology it will advance of WIFI. It transmits a data faster than WIFI. Our Project Monitors patient health via LI-FI and it will and communicated and monitored by IOT is real-time technology to monitor every field. It will place important role in healthcare, monitoring patient different parameters. For that different sensors are used to sensor values are monitor real time in IOT server. It will monitor individual patient and in case of emergency the doctor alerted by IOT and required treatment is given to that patient.

## II. LITERATURE SURVEY

Dr. Harald Hass provided a deep insight in this technology, He introduced an illustration of Li-Fi in the year 2011 at TED Global Conference in Edinburgh, he demonstrated the use of Li-Fi and advantages of Li-Fi over Wi-Fi. His research led many people to work upon this technology [5]. After that Liang Yin (student member IEEE) together with Prof. Harald Hass made an attempt to show the clear difference between visible light communication (VLC) and light-fidelity (Li-Fi), Further they enlightened us how Li-Fi takes VLC by the use of light emitting diodes [6].

Eugene C Nelson professor, Elena E ftimovska researcher in the year 2014 researched about the Clinicians understanding of the effect of disease and treatment on patients daily lives is poor. In response to this problem, over the past three decades, hundreds of standard is edmeasures have been developed to capture patient reported outcomes, including symptom status, physical function, mental health, social function, and well being. However, the patient reported outcome measures (PROMs) movement has largely been driven by the agenda of researchers or service payer sandhas failed to focus effectively on improving the quality of care from the patients perspective [8].

Birgit Wilhelm, Senait Forst ,Matthias M. Weber, MartinLarbig, Andreas Pftzner , Thomas Forst . 2006. Evaluation of CGMS During Rapid Blood Glucose Changes in Patients with Type 1 Diabetes. *Diabetes Technology and Therapeutics* 8:2, 146-155. [Abstract] [PDF] [PDF Plus]. 2006. Psychological aspects of continuous glucose monitoring in pediatric type 1 diabetes. *Pediatric Diabetes R. Hovorka*. 2006. Continuous glucose monitoring and closedloop systems. *Diabetic Medicine [CrossRef]* David C. Klonoff. 2006. Continuous Glucose Monitoring Technology Delivers Detailed Diabetes Data. *Point of Care The Journal of Near-Patient Testing and Technology* [ 9 ].

K.L.Nishitha<sup>1</sup> , R. Ravi Kumar<sup>2</sup> . HEALTH MONITORING SYSTEM Intelligent health monitoring system of the long-span railway stayed requires the comprehensive knowledge of instrumentation, analytical and information processing technologies with the knowledge and experiences in design, construction, operation and maintenance of railway equipment for long-term monitoring the performance throughout its lifecycle. It is necessary to perform sensor-based structural monitoring for identifying the conditions in order to assure the structural safety and to evaluate the operational performance. The considerations for deploying a proper monitoring system are appropriate sensor instrumentation, robust signal acquisition, reliable signal processing, and intelligent signal and information processing. Sensor and hardware instrumentation, signal transmission, signal acquisition and analysis are schematically described mainly. Fire and gas sensors are used to protect entire train system. And for passenger safety, we are attaching a wireless RF system. With this advanced equipment, the exact dangerous spot is known with in less time.

Premalatha<sup>1</sup>, R.P. Keerthana<sup>2</sup>, R. Abarna<sup>3</sup> HUMAN HEALTH MONITORING SYSTEM . - Moving into a new era of healthcare, new tools and devices are developed to extend and improve health services, such as remote patient monitoring and risk prevention. In this concept, Internet of Things (IoT) and Cloud Computing present great advantages by providing remote and efficient services. In India many patients are dying because of heart attacks and reason behind that they are not getting timely and proper help. To give them timely and proper help first we want to continuous monitoring of patient health. The fixed monitoring system can be used only when the patient is on the bed and this system is only available in hospitals. The system is developed for home use by patients that are not in critical condition but need to be constant or periodically monitored by clinician or family. In any critical condition the SMS is send to doctor or any family member. In this paper, a prototype of a wireless health monitoring system capable of sending SMS related to the health status of the patient is developed.

## III. PROPOSED METHOD

In the proposed system the patient is monitored using Li-Fi instead of Wi-Fi. It reduces the radio interference in the human body. Patient is monitored using different sensors like temperature, heart beat and motion sensor. The sensed data is then converted into digital form in the microcontroller. The output of the microcontroller is sent to the Li-Fi module. The data is then transmitted in the form of light through the Li-Fi module and detected in the receiver side by the photo detector. The received is sent to the concerned person through mobile.

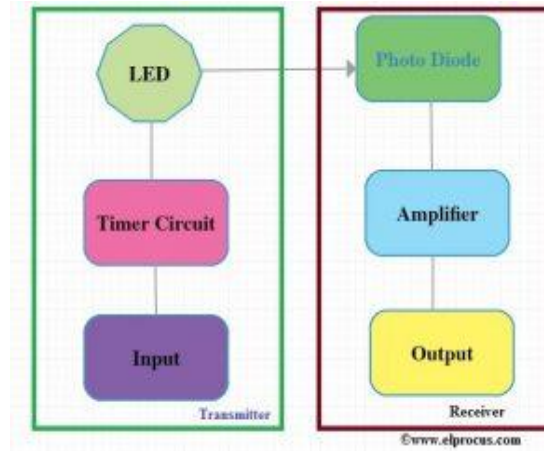


Fig1: Proposed Method

The working of the Li-Fi module is very simple. It uses the concept of LEDs where logic 1 represents the data transmission and logic 0 represents that there is no transfer of data. The patient monitoring using the Li-Fi is done with the help of sensors. The sensors that are used in this model are temperature, heart beat and Accelerometer which will perform its necessary function. The sensed data are converted into the digital form using the analog to digital converter which is inbuilt in the microcontroller AVR ATMEGA. The data is then transmitted in the form of light through the Li-Fi module.

#### IV. RESULT

A device for holding a heartbeat sensor in a relatively fixed relationship with respect to the end of a user's fingertip. More particularly, a device is disclosed wherein a single sheet of resilient material is formed into a base portion for holding the heartbeat sensor and three resilient bands that extend upwardly therefrom. The bands are adapted to grip the user's fingertip. In one embodiment of the invention, the bands and base portion define a U-shaped channel of constant cross-sectional area. In this embodiment a holding structure for the heartbeat sensor is wedge-shaped, the wedge-shaped holding structure being adapted to be held by the base portion so that the cross-sectional area defined by each band and the wedge-shaped holding structure decreases along the longitudinal length of the base portion. In another embodiment of the invention, each band defines a smaller cross-sectional area with respect to the base portion. Thus both embodiments result in more pressure being applied to the sensor at the portion of the user's fingertip closest to the end.



Fig2: Sensor



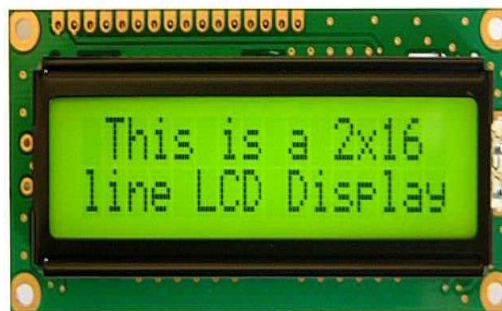


Fig3: Display

In a specific embodiment of the invention, a single sheet of resilient material is formed into a base portion and three flexible bands extending upwardly and over the base portion. Each of the bands partially forms an arch with respect to the base portion and is adapted to grip a portion of the user's fingertip. A holding structure for the heartbeat sensor is also provided, the holding structure being in the form of a wedge having its thickest portion closest to the end of the user's fingertip. The holding structure is adapted to be held by the base portion.

## V. CONCLUSION AND FUTUREWORK

All these parameters are stored in Arduino microcontroller and then it will be uploaded and Receiver receive a data from LI-FI transmitter and it will monitored by PC and IOT server in case of emergency IOT server monitored doctor or emergency message sent to doctor he will prevent the treatment for the particular child. The main advantage of this project is monitoring child using LI-FI it will Transmits data of child incubator faster than WIFI and it will also communicate with IOT Server. Even child having a heart problem for birth itself we can monitor child heart beat and in case of emergency immediately alert doctor. Every human life is important, health monitoring place a important role in this for that we are designed this project efficiently Patient monitoring can be done efficiently using Li-Fi technology. It reduces the radio interference in human body. It measures the data of the patient automatically and continuously. In the future this system can be used to monitor many patients. Every Bulb in the hospital can be used to monitor the patient.

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