

Li-Fi Based Patient Monitoring System

M.DIVYA REDDY¹, DR. SAVITA SONOLI²

Abstract: In the past pace of life it is difficult for people to be constantly available for their near ones who might need them while they are suffering from any disease or physical disorder. So constant monitoring of the patient's body parameters such as body temperature, Pulse rate and sugar level etc becomes difficult. Generally in ICUs nurses are taking care of abnormalities and the health of the patient but they may not be available for taking care of patient's health 24X7. So sometimes in absence of care taker it may happens that the health of the patient becomes abnormal /critical from normal condition. So to remove these critical conditions we have proposed an automatic low cost microcontroller & intelligent Wireless Li-Fi based Advanced patient monitoring system which continuously in the regular interval of time measuring the intensive parameter of the patient's health and if any abnormal condition occurs, it directly sends a message to the doctor's base station machine via Li-Fi that particular word no's particular parameter is out of the range. Due to this alert message, Doctor can do the fast assessment of the patient's health without wasting the time.

Keywords: LED, ICU, LI-FI.

I. INTRODUCTION

LI-FI communicate information all the alignment via sending fiber optics and produce fiber from it information in course of LED light changes which is faster than the human eye. LI-FI is defined as faster and modest remote correspondence frame work as it is visual adaption of WI-FI. Firstly this definition was used by herald has in visible light communication, If LED is ON ,we transmit 1, if it is off it will transmit 0. Harald has said rapidly if there is exchange in ON and OFF it transmit data at open doors. We can flexibly encode information from light by changing rate of LED's, firstly where ON and OFF is the series of 1's and 0's. LED force is very fast where a human eye will not be able to detect that force. University of Edinburgh are setting up on similar transmission of LED, each LED can transmit alternate information. These LED's can utilize red, green, and blue. A Scientist Heinchi Hertz institute which is in Germany tells that rate of information is more than 500 bytes for every second which is utilized by these white-light LED's.

II. LITRETURE SURVEY

Early in the year 1990's countries like Germany, Japan as discovered LED's to send information when it is switched ON and OFF Next to TED Herald verified a transmission pf data rate at 10mbps which is as equal as UK broadband connection after two months he achieved 123mbps On 12th June 2011 a table lamp was used with an LED bulb to broadcast a video which was projected on a screen behind him at an event light which is blocked from lamp as proven that lamp certainly a source of incoming data Team at Oxford university from ending burgh college are planning on parallel information transmission utilizing to display LED's where it can transmit alternate information stream.

III. MOTIVATION

The main aspire of this project is to pass message through wireless communication to doctor regarding patient health condition who are in emergency. Usually in hospitals and clinics a single doctor should look after patient so to doctors it has become very difficult to monitor each patient condition continuously this project has a source which can continuously monitors patient condition that message is transmitted continuously. If any critical situation undergoes by a patient sensor senses abnormality of patient and communicate to consultant doctor by means of a message displayed on LCD screen.

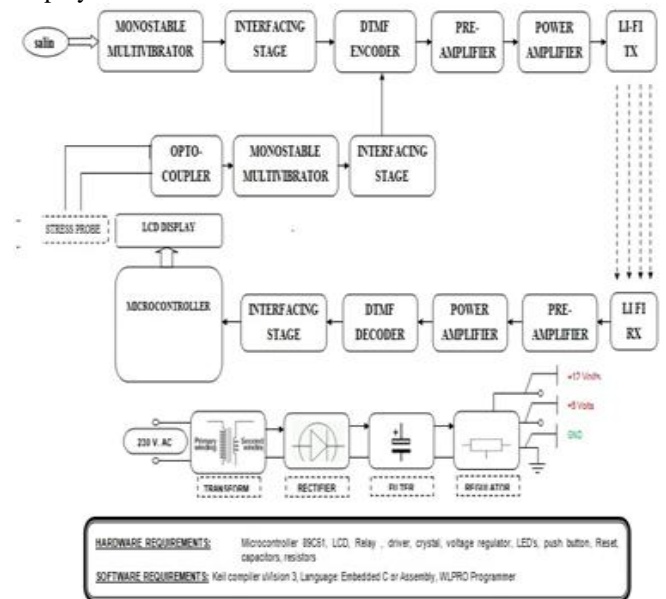


Fig.1. Block diagram.

Block Diagram: Block diagram is shown in Fig.1 and description is as follows

Power Supply Unit: This section needs two voltages viz., +12V & +5V, as working voltages. Hence specially designed power supply is constructed to get regulated power supplies.

DTMF Encoder: DTMF encoder receives input signal and encodes it generates a frequency, it is a 16 bit combination (4*4) and it selects (C₁, R₁) for first output & (C₂, R₂) for second output.

DTMF Decoder:DTMF decoder is used to decode signal. It generates two frequencies at same time. It compares row frequency and column frequency it is called as dual tone multi frequency signal. It selects two frequencies low row frequency and high column frequency vice versa that decodes signals is fed into microcontroller.

Microcontroller: Here we use Atmel AT89 series for micro controller it is an series of Intel 8051 compatible of 8 bit microcontroller due to industry standards Atmel89 has become very popular as microcontroller and it is low in cost compare to AT90 series it is powerful.

Preamplifier: An preamplifier has small electric signals are used for further processing which reduces noise and makes weak signals strong and passes to power amplifier.

Power Amplifier: An power amplifier that amplifies low power signals and gives required voltage to LED's which uses pre-amp output to increase further more which is sufficient to load.

Li-Fi Transmitter And Receiver: LiFi transmitter it combines with carrier frequency and modulation takes place that fed into fibre optics (LED's, bulbs) it uses white LED's for transmission of signals.

Buffers: Buffer is not dependent on logical state in case if (input logic 0 gives output logic zero & vice versa) buffer produce extra current to driver near output inverters are used to balance logic state(input logic 1 gives output logic 1& vice versa).

Drivers: It is a electromagnetic device which is used to drive the relay, it operates 2033 IC if input is high output will be zero it is a complimentary fashion as similar(not gate) operation.

Relays: It is a electromagnetic switch which is used to drive load connected across relay and o/p of relay can be connected to controller for processing further.

Monostable Multivibrator: Monostable multivibrator operates with 555 IC which gives only a stable state and gives only a single output when it is triggered externally at a constant time period it returns back to its original stable state which is determined by RC coupled circuit.

Opto Coupler: It acts as isolation between input and output main reason for using opto coupler is there will be a rapid changes in voltage and circuit from damaging components

near LED opto coupler is connected as light source which converts electrical signal into light. Electric current flowing from power supply is modulated and generates electrical energy.

LDR: Light dependent resistor is a light controlled by a variable resistor with increase in incident light intensity resistance normally resistance of an LDR is very high.

LCD Display: LCD acts as an interface for user and uses for any kind of application Hitachi 44780 is common type of LCD we are using which an interface between a processor and an LCD.

IV. METHODOLOGY

This project is designed to monitor the patient health care and if any emergency is there it will send information to the respective receiver with the help of Li-Fi Technology. Li-Fi is a new and wireless technology to transfer information wirelessly. Here the patient Saline bottle will be monitored continuously, if that bottle becomes empty then the will detect that and it will activates the Encoder with the help of Multivibrator and Interfacing stage. Then that information will be transmitted to the receiver through LI-FI transmitter. Another parameter is patient stress, here stress probe will be there monitor the patient stress continuously, if that crosses the minimum level then the sensors will detect that and it will activates the Encoder with the help of Multivibrator and Interfacing stage. Then that information will be transmitted to the receiver through LI-FI transmitter. At another side LiFi receivers will receives information from LiFi transmitter and after receiving it will decodes the coded signal with the help of DTMF Decoder, after decoding that information will send to the microcontroller. After receiving, the microcontroller will displays the measured parameters like Saline Bottle Empty, Stress is high.

Applications:

- Hospitals and institutions.
- Defence & security.
- Underwater communication.
- Services provided based on location.
- Patient is monitored in remote areas or while travelling.
- Mobile connectivity.
- Smart lighting.
- WiFi spectrum relief.

Advantages:

- It is not harmful for human body.
- Energy consumption is very less.
- Increase in security.
- Patient can be continuously monitored without human interface.
- This is very effective way for transmitting information to health care staff and health care providers.
- No harmful rays that effect human life.
- Low cost.
- Time saving.

V. FUTURE ENHANCEMENT

This can be practically used every light and bulbs can be used as Wi-Fi for wireless transmission of data which will be brighter and safer side in future it is very cheap compare to WIFI. Data for laptops, mobiles and tablets can be transmitted through light by using it in rooms.

VI. CONCLUSION

The main purpose of using this project is to help a doctor to treat a patient when he is in emergency, through this project we can monitor a patient for (24*7) that a normal person cannot do if a patient is in abnormal condition controller detects that and display message on LCD to the doctor even if he is away from patient. So he can immediately respond for treatment as this technology is not hazardous to human health this is the advantage of this project.

VII. HARDWARE KIT

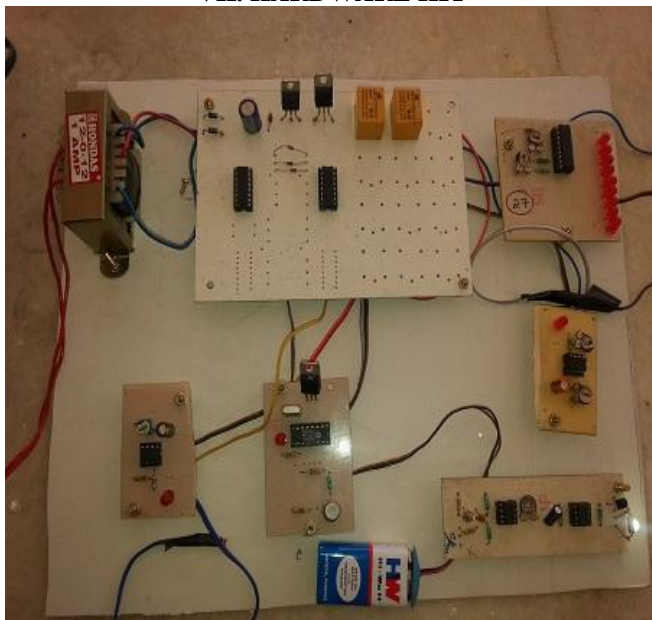


Fig.2. LIFI TX.

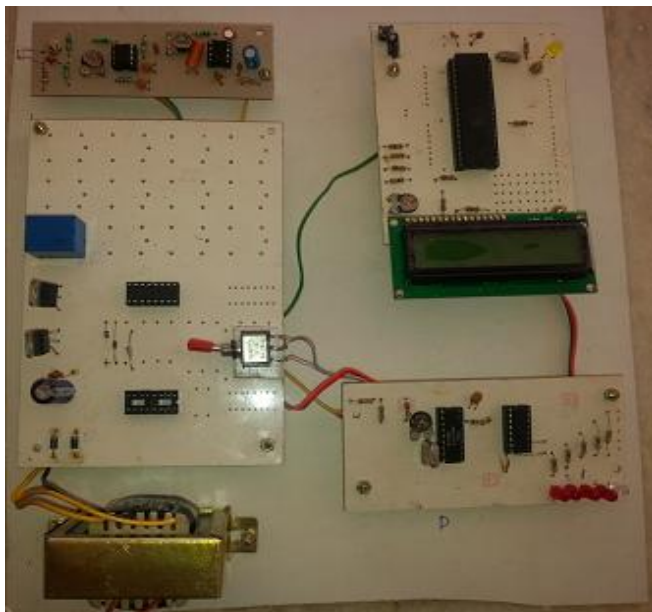


Fig.3. LIFI RX.

VIII. OUTPUT

A. First Out



Fig.4.

B. Second Output

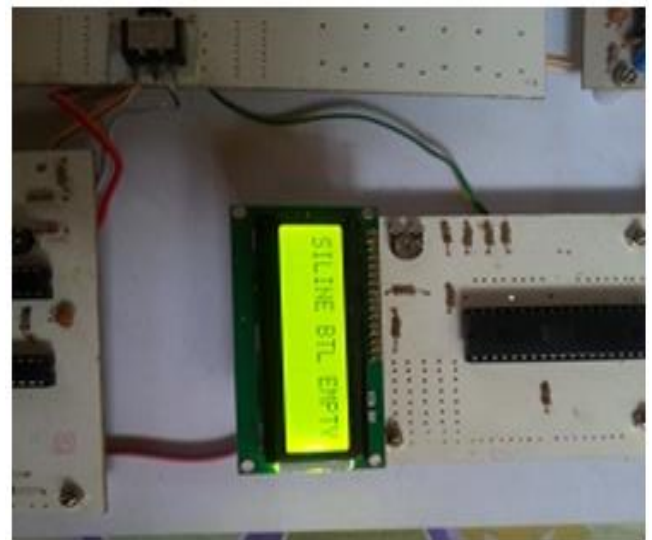


Fig.5.

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Author's Profile:

M.Divya Reddy Obtained Her B.Tech degree in Electronics And Communication Engineering From Sri Sai Jyothi Engineering College ,JNTU,Hyderabad .And Pursuing her M.Tech Rao Bahadur Y. Mahabaleswarappa Engineering College Vtu,Bellary, Karnataka, India.

Dr.Savita Sonoli M.Tech-IE,Ph.D Working As Head Of The Department Of Eletronics And Communication Engineering in Rao Bahadur Y. Mahabaleswarappa Engineering College Vtu,Bellary, Karnataka, India.