

Design of Vehicle To Vehicle Data Transmission Application Using Li-Fi Technology

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Abstract - Li-Fi may be a new paradigm for brief vary wireless technology to supply new property among a localized data-centric surroundings. Li Fi may be a transmission of knowledge through illumination, causation knowledge through a semiconductor diode light-weight bulb that varies in intensity quicker than human eye will follow. This type of communication are often known as actinic ray communication (VLC). Victimization this system, the user will transmit the information through light-weight from one device to a different. In recent years, wireless networks and applications have achieved marvellous successes in government, enterprise, home, and private communication systems. Li-Fi technology works on a straightforward digital principle that is nothing however associate semiconductor diode is ON a digital knowledge one are often transmitted and if it's OFF digital knowledge zero are often transmitted. So, during this project work we have a tendency to be reaching to switch the LEDs terribly quickly. These quick switch are often achieved by PWM technique to transmit digital knowledge stream containing strings. To amass this, we have a tendency to be programming the microcontroller to vary the duty cycle of the PWM signal that has the task of regulation this within the semiconductor diode. The biased current is fed to semiconductor diode driver unit. The ability of semiconductor diode is varied in step with the undulation of knowledge signal. At the receiver aspect photodiode device produces a current proportional to the received instant power. This Paper Proposes Vehicle to Vehicle Communication victimization Li-Fi.

I. INTRODUCTION

Li-Fi is a high speed, bidirectional and totally networked Wi-Fi verbal alternate community like Wi-Fi. Both Wi-Fi and Li-Fi work in the route of facilitating basic switch of data. However, Li-Fi that transmits data through using slight is said to be a hundred situations faster than Wi-Fi as it can attain a tempo of 224gbps. Li-Fi uses infrared or shut to ultraviolet spectrum to transmit information. The greatest benefit of this technological information is that the light ways can't pass through walls, so there is a most efficient range resulting in immoderate safety from hacking and high-speed connectivity.

In Li-Fi technological know-how we have to section one is the Transmitting and different receiving. The above block diagram represents the Transmission part of the vehicle, in the task the necessary cause is Vehicle to Vehicle communication, from one car we will speak and display the one of a kind vehicle. In the technological know-how of overcrowded (data communication) world, Li-Fi is a new way of Wi-Fi communication that makes use of LED lights to transmit documents wirelessly. Transmission of information is one of the most essential day to day activities in the quick developing world.

The modern-day Wi-Fi networks that be a part of us to the Internet are very gradual when a couple of units are connected. Also with the make bigger in the range of devices which get entry to the Internet, the availability of constant bandwidth makes it lots extra hard to revel in excessive data switch expenses and to join an impenetrable network. Radio waves are simply a small phase of the electromagnetic spectrum reachable for files transfer. Li-Fi has received an awful lot broader spectrum for transmission compared to conventional methods of Wi-Fi communications that be counted on radio waves. The basic ideology at the lower back of this technological information is that the data can be transferred through LED mild by way of the use of a number of mild intensities quicker than the human eyes can perceive.

This technology makes use of a phase of the electromagnetic spectrum that is still not considerably utilized- The Visible Spectrum, alternatively of Gigahertz radio waves for data transfer. His concept of Li-Fi was introduced for the first time by way of a German physicist Harald Hass in the TED (Technology, Entertainment, and Design) Global discuss on Visible Light Communication (VLC) in July 2011, by way of referring to it as "data thru illumination". He used a desk lamp with an LED bulb to transmit a video of a blooming flower that used to be then projected onto a screen. In simple terms, Li-Fi can be concept of as a light-based Wi-Fi i.e. alternatively of radio waves it uses light to transmit data. In place of Wi-Fi modems, Li-Fi would use transceivers fitted with LED lamps that should mild a room as properly as transmit and acquire information. By including new and unutilized bandwidth of considered light to the presently on hand radio waves for data transfer, Li Fi can play a main

function in relieving the heavy loads which the existing day Wi-Fi device is facing. Thus it may also provide extra frequency band of the order of 400 THz compared to that on hand in RF communication which is about 300 GHz. Also, as the Li-Fi makes use of the viewed spectrum, it will assist alleviate issues that the electromagnetic waves coming with Wi-Fi ought to adversely have an effect on our health. By Communication through visible light, Li-Fi technology has the opportunity to exchange how we access the Internet, circulation videos, receive emails and a lot more. Security would now not be a problem as data can't be accessed in the absence of light. As a result, it can be used in excessive security military areas where RF communication is inclined to eavesdropping.

By **Shinichiro Haryana** et.all,[1] visible mild conversation is a new way of Wi-Fi conversation using viewed light. Typical transmitters used for seen mild conversation are visible mild LEDs and receivers are picture diodes and image sensors. We existing new purposes which will be made possible through visible light communication technology. Location-based offerings are regarded to be especially appropriate for visible light communication applications.

By **JibingTuo** et.all, [2] in this paper, we show a high velocity considered light dialog machine based totally on a commercially on hand high-power phosphor-based white mild LED. An excessive 3dB modulation bandwidth up to 85 MHz is received through designing a passive post-equalizer circuit for the blue LED element and a transmission rate of 250 Mbps using On-Off Keying is additionally confirmed the use of received eye diagrams.

By **M. Saadi** [3] with the materialization of light emitting units for strong country lighting, seen mild verbal exchange (VLC) has provided a prospect to recognize low cost, excessive speed, strength environment friendly and secure data transmission in addition to lighting. Incandescent and fluorescent light sources are being changed through light emitting diodes (LED) which are now not only energy

Efficient but also help in decreasing carbon dioxide CO₂ emission. In this paper, experimental results are being the use of a new protocol for VLC and the best placement of the LEDs inside the transmitter to maximize the transmitter foot prints.

By **Stefan Schmidt Disney** et.all, [4] An LED can emit and receive mild and offers consequently a simple building block for a Visible Light Communication (VLC) system. We describe a microcontroller-based system and document on its effectiveness in a testbed. The key idea is to use a microcontroller to supply synchronization so that the receiver can lock to the transmitted signal in a fast and surroundings friendly way. Further we endorse a combined

mild emission and moderate size approach to obtain with an LED while emitting light. The proposed device allows new interesting applications through developing the illusion (for a human observer) that both transmitting and receiving LEDs are always switched on.

By **Hyun-Seung** et.all, [5] A RF service allocation in visible mild conversation is proposed to mitigate inter-cell Interference for the software of indoor positioning system. The discount of inter-cell interference and crosstalk effect amongst cells are analyzed through experimentation.

II. BLOCK DIAGRAM

Transmission Section

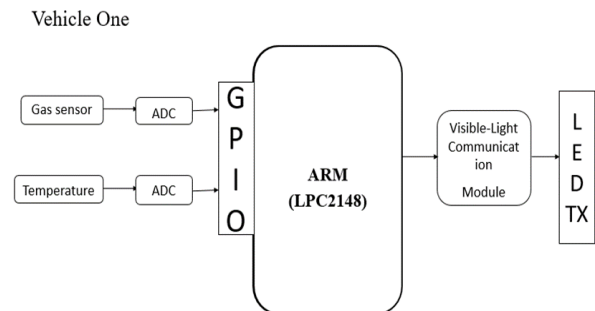


Fig: Block Diagram of Transmission Section

Description

In the transmission section we have Gas sensor and Temperature sensor which are embedded in the one automobile i.e. Transmission section, right here a ARM7 (LPC2148) Microprocessor being used which is related to the gas and temperature sensor which will gather the sensor price and ship to the Receiver section through the Visible light communication (VLC). Visible light communications (VLC) works through switching the present day to the LEDs off and on at a very immoderate rate, too rapid to be seen through way of the human eye. Although Li-Fi LEDs would have to be saved on to transmit data, they ought to be dimmed to under human visibility whilst nonetheless emitting enough light to lift data. The light waves can't penetrate walls which makes a lot shorter range, although greater secure from hacking, relative to Wi-Fi. Direct line of sight is now not essential for Li-Fi to transmit a signal; mild reflected off the walls can achieve 70 Mbit/s.

RECEIVER SECTION

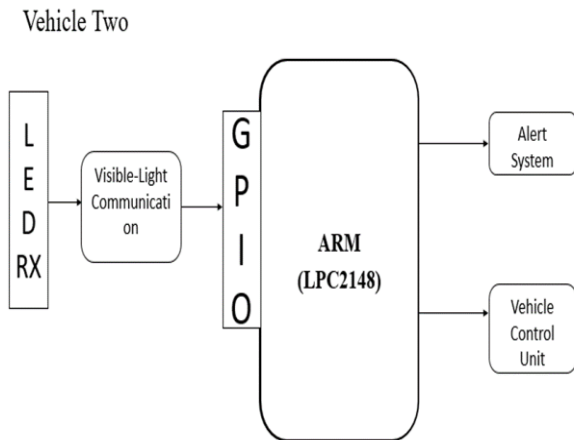


Fig: Block Diagram of Receiver Section Description

In the Receiving part as mention in the above block design the ARM7 (LPC2148) will collect all the information through the first vehicle from the Visible Light Communication (VLC), and additionally monitor the values of the hearth and Temperature sensor. As there any abnormality in any sensor values in the first automobile loading...And additionally the automobile manage will react accordingly.

FLOW CHART

Transmission Section

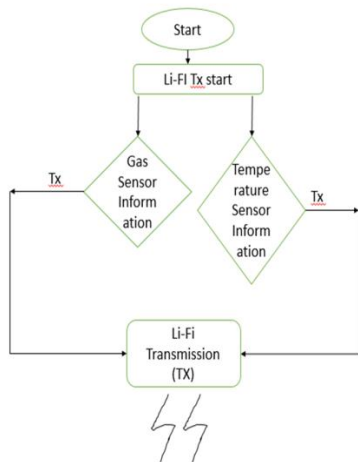


Fig: Flow Chart of Transmission Section

Both the vehicle will start the transmission area i.e. automobile one is embedded with the Gas and temperature sensor. The board is programmed using a Keil software

with Embedded C programming language and as the software begins the Gas sensor and temperature sensor values will preserve on updating and will send the data to the second vehicle thru the Li-Fi Technology used in this project. The program is in the countless loop in order to exchange the sensor values continuously.

RECEIVER SECTION

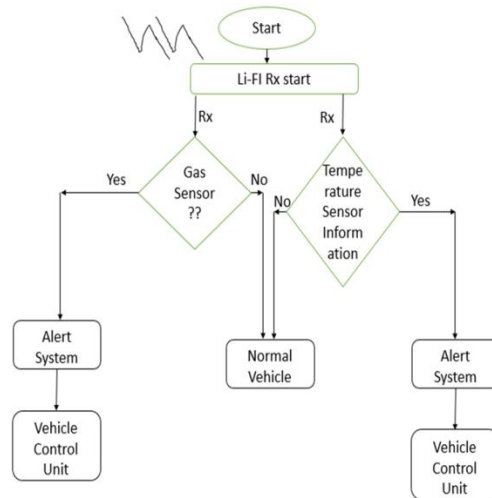


Fig: Flow Chat of Receiver Section

The second vehicle will be programmed in the way that it will receive the information from the receiver of the Li-Fi and send it to the ARM7 board and in accordance to the values if any abnormality in the Gas sensor then automatically the buzzer (Alert system) will change on and in the case of the Temperature sensor is any fire accident happens in the first vehicle automatically the 2nd vehicle will change On the Motor (water sprinkler) i.e. the Vehicle Control unit will ON automatically.

III. RESULTS AND DISCUSSION

The top view of the front car and back car is presented. The pinnacle view offers the number of sensors interfaced with the control unit. The Top view of the front car consists of a buzzer and a LCD display to notify the driver with a warning message. The Photodetector is used in front car to receive the data transmitted by the LED.

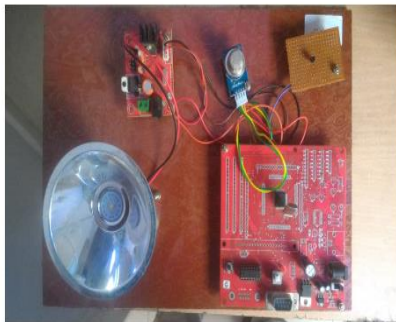
Receiver Section

**Fig: Top View of front Vehicle**

The Back vehicle consists of Ultrasonic sensor to measure the distance between the two vehicles. An Eye-Blink sensor is used to check if the driver is drowsing at the same time as using and alcohol sensor is interfaced with control unit to locate if the driver is intoxicated by Alcohol and use the LED to transmit the security associated message so that the front car can be notified.

RESULTS

Transmission Section

**Fig: Top View of Back Vehicle**

IV. CONCLUSIONS

In the present day era, Wi-Fi technology is something that is mandatory. Li-Fi is a high speed, bidirectional and fully networked Wi-Fi communication community like Wi-Fi. Both Wi-Fi and Li-Fi work towards facilitating easy switch of data.

However, Li-Fi that transmits data via mild is said to be 100 times faster than Wi-Fi as it can reach a speed of 224Gbps.

The largest gain of this technology is that the light ways cannot pass through walls, so there is a stronger vary ensuing in excessive security.

V. FUTURE SCOPE

The future of LI-FI is GI-FI. GI-FI or gigabit wireless refers to Wi-Fi communication at an information rate of quite one billion bits (gigabit) per second. In 2008 researchers at the University of Melbourne established a transceiver integrated on one microcircuit (chip) that operated at sixty rate on the CMOS method. It'll permit Wi-Fi transfer of audio and video knowledge at up to five gigabits per second, 10 instances this most wireless transfer rate, at common fraction the value. Researchers designated the 57-64 rate unaccredited waveband since the millimeter-wave vary of the spectrum allowed high part on-chip integration as properly because the integration of terribly tiny high gain arrays. The accessible seven rate of spectrum leads to terribly high knowledge rates, up to five gigabits per second to users among an internal surroundings, sometimes within a variety of ten meters. Some press reviews known as this "Gi-Fi". it absolutely was developed by Melbourne University-based laboratories of NICTA (National ICT Australia Limited), Australia's info and engineering analysis Centre of Excellence.

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