IJIREEICE

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

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING
Vol. 4, Issue 4, April 2016

Li-Fi Technology-Vehicle to Vehical Data Transmission

Mr. Jagdish A. Patel[1], Sagar C. Dighe[2], Shubhangi S. Shinde[3], Yashwant N. Memane[4], Suvarna B.Mahajan[5]

Assistant Professor, Department of Electronics & Telecommunication Engineering,

Sandip Institute of Technology & Research Center, Savitribai Phule Pune University, India[1]

B.E. Students, Department of Electronics & Telecommunication Engineering,

Sandip Institute of Technology & Research Center, Savitribai Phule Pune University, India[2, 3, 4, 5]

Abstract: Vehicle to vehicle data transmission, we present initial designs and results of a small-scale prototype using light fidelity (Li-Fi) technology, a new technology that was developed in the last few years, which still needs more systematic inquiry on its sustainability for outdoor vehicular networks. Vehicle to vehicle communication is the most effective solution we have used in order to reduce vehicle's accidents. In Li-Fi technology for vehicle-to-Vehicle data transmission we use LED bulb. In this technology there is elimination protocols use so in Li-Fi technology complexity get reduce. The aim of designing this system is highly reliable which give desired data transmission between vehicle-to-Vehicle by using transmitter and receiver mounted on vehical.

Keywords: Light Emitting Diode, Photodiode, Vehicle to Vehicle Communication, Visible Light Communication

I. INTRODUCTION

Li-Fi is an important and popular technology in the communication system. Li Fi is known as Light fidelity communication systems. It is the very fast and inexpensive wireless communication systems and is the optical version of the Wi-Fi. The technology works by adapting light emitting diode (LED's) to send digital type of information, invisible to the naked eye. In this, we design prototype which is based on Li-Fi technology for vehical to vehical data transmission. Vehicle to vehicle communication is the most effective solution that has been used in order to reduce vehicles accidents. In LI-Fi technology data transmission through light for this purpose source of light is used as LED. Vehicle to vehicle communications, for instance, is one of the previous trends, which is one of the most effective mechanisms that will implement in automobiles to provide safety and a protocol of communication. Tremendous amount of research work on vehicle.

II. OBJECTIVES

It used to give as an alternative or upgrade add-on to existing wireless technologies .To re established high speed connection quickly (in case of disaster problem).Li-Fi is used because it is fast and optical version of Wi-Fi which is very cheap.

III. WITHOUT WI-FI OR GPS

Vehicle to vehicle communication system that does not require a tracking global positioning System or even a Wi-Fi or 3G wireless connectivity. In Figure1.1 it will propose to use Programmable Interface Controller (PIC) sonar which sends 40 KHz short pulse of sound that is undetectable by human ear. The echo of the signal will be detected by micro controller. The distance is calculated by the time require for echo signal to be transmit and receive.

Several research works we will attempt in literature for vehicle to vehicle communication using an advantage of light. As light frequency spectrum is huge, it is beneficial to be adopt in a short-range wireless communication.

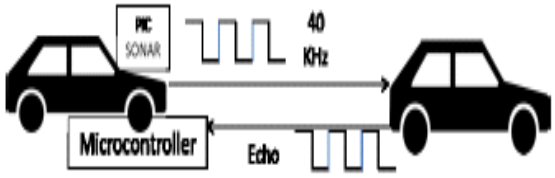

Fig. 1: Communication between Vehicles Using Sonar Pulse

IV. METHODOLOGY

Communication between Vehicle to Vehicle and Ranging System has been proposed by using Spread Spectrum Technique. In this, a vehicle (Vehicle-A) provides the information about distance between target vehicle (Vehicle-B) and vehical A. However, in this system, only one target vehical is used in this paper, we also design multi target Communication and Ranging for vehical to vehical data transmission System by Using Spread Spectrum Technique. In this system, at the same time vehical A can communicate with other target vehicals. From computer simulations, When interference signals is exist then we confirmed that this system become effective [1].Vehicular ad hoc network (VANETs) that means devices have not access point is used for real time application such as (VANETs) can communicate with roadside units(RSU).By this communication provides information about traffic, accurate position of vehical. For this purpose number of protocols should be used to get desired output.

IJIREEICE
ISSN (Online) 2321 – 2004
ISSN (Print) 2321 – 5526
INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING
Vol. 4, Issue 4, April 2016

V. PROPOSED SYSTEAM

The propose plan of action for our project is to initiate on optical wireless communication model that gives high data rates (in the range of MHz to GHz) and transmission distances is near about 1m. For data transmission from one device to another device required LED. In this system at the transmitter section input data give to the switching control system. Based on the data, the switching control generates a stream of 1s and 0s thereby encoding the data in binary. The output of this control is given to the array of LEDs which turn OFF and ON at extremely high speeds. This ON-OFF modulation of the LED light transmits the data. LED is the choice for light source since it consumes very less power when compare to fluorescent lamp or a light bulb. It consumes less power that is one-tenth power requirement as compared to conventional methods for lightning. Also, the lifetime a typical LED bulb is several tens of thousands of hours. LEDs are also fast switching with good visibility. Thus, LEDs are ideal for use as the downlink transmitter. For the uplink transmitters, Infrared (IR) can be chosen to be the uplink transmitter for user convenience. This avoids fitting an LED light source on or next to the mobile devices. The receive section consists of a photo diode, such as Infrared germanium cylindrical detector and silicon photo detector. The photo detector extracts the incoming received signal based the sequence of 1s and 0s. The demodulated signal is then sent to a filter destroy unwanted noise. This filter signal is then amplify using signal amplification mechanism. The filter and amplify signal is then given to an output device such as an LCD display or speaker. The input signal is thus remotely transmitter and receiver. Thus Li-Fi network is established

VI. SYSTEM ARCHITECTIRE

According to user input. Sender will send the message to micro controller which convert normal message to ASCII then this ASCII message is given to NPN switching circuit which is used to boost the signal. Then this signal is given to PNP switching module which revert the message which was inverted by NPN switching circuit. Then this reverted message is given to syska LED which transfer ASCII message into LED spectrum. Now at receiver side photo transistor will receiver message obtained by LED. Then photo transistor pass message to impedance matching circuit which sensing data in proper format. This signal is given to TTL to USB circuit which convert ASCII message into normal message

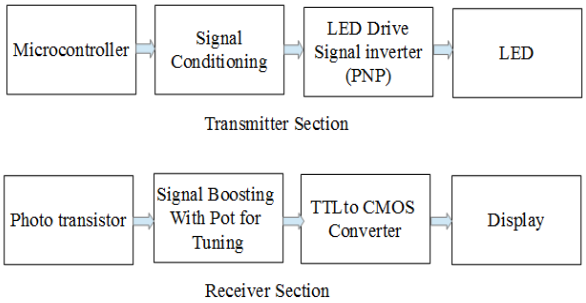

Fig. 2: Block Diagram of Vehicle To Vehicle Communication Using Li-Fi

The functionality of the building blocks of the system is described next. The data source e.g. (speed sensor) reads the speed of the vehicle. The speed data from the sensor is peak to peak AC voltage so it will be converted to DC voltage to be readable by the microcontroller. Then the data will be processed by microcontroller (e.g. to compare between the current and previous speed). New processed data will then be transmitted to the LED driver. LED driver will make the current constant to protect LED. Then, data will transmit by the LED light.

VII. SYSTEM DESIGN

The system requires a transmitter and a receiver in each vehicle in both rear and front sides of the vehicle. Thus more scenarios will be applicable. For the time being, only two scenarios will be studied in this paper:

A: First Scenario:
As shown in Fig 3 when vehicle 1 is braking, the speed meter in the vehicle will be sensing that the current speed is lower than the previous speed. Thus, a message will be sent through the transmitter which is placed in the rear lights to vehicle 2. The message will be received by vehicle 2 using the photodiode which is placed at the front of vehicle 2. A notice of (Slow DOWN) will be displayed in vehicle 2 using an LCD.

Fig. 3: First scenario of vehicle to vehicle communication using Li-Fi.

B: Second scenario:
As shown in Fig 4 when vehicle 1 is in T- junction, it will keep sending its speed-information to vehicle 2 using the LED at the headlights. The speed-information will be received by the photodiode in vehicle 2 and compared to vehicle 2 speed's. If vehicle 2 is about to cross the junction while vehicle 1 is moving with a high speed, the driver will be alerted to check the other vehicle which is around in the area.

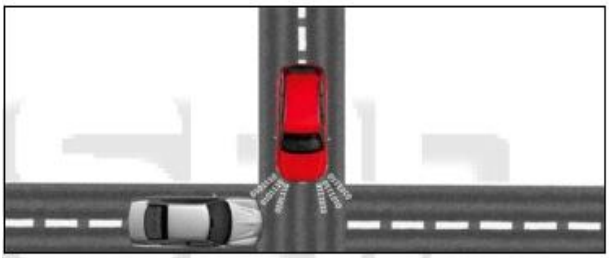

Fig. 4: Second scenario of vehicle to vehicle communication using Li-Fi.

VIII. CONCLUSION

The concept of Li-Fi will introduce along with existing techniques and classical trends used for vehicle to vehicle communications. In this project aims to propose a cost

effective solution to reduce accidents in Oman, the design guidelines. The hardware aspects regarding the development of a VLC communication system consisting of a commercial LED-based traffic light and a vehicle will mount receiver. We will present the approach we follow, some of the difficulties we encounter and explain the choices we have made. Throughout the implementation process, we also efforts on keeping the implementation cost as low as possible. Due to unavailability of all system components, sending data through Li-Fi small-scale prototype.

ACKNOWLEDGEMENT

It is our immense pleasure to work on this Project, Design of Vehicle to Vehicle Data Transmission Application using Li- Fi Technology. It is only the blessing of my divine master which has prompted and mentally equipped me to undergo the study of this Project. I would like to thank, Principal **Dr. S.T. Gandhe**, SITRC for giving me such an opportunity to develop practical knowledge about subject. We are thankful to **Dr. G.M. Phade,** Head of Electronics and Telecommunication Engineering Department for his precious encouragement at every phase of our Project Work. I offer my sincere thanks to my guide **Prof. Jagdish A. Patel** affectionately encourages me to work on the subject and gave her valuable guidance time to time. Current wireless technology channel capacity, availability security, efficiency are overcome in this technology.

REFERENCES

[1] Kiyoshi MIZUI, Masao NAKAGAWA, "Vehicle-to-Vehicle Multi Target Communication and Ranging System Using Spread Spectrum Technique".
[2] Lina Altoaimy, Imad Mahgoub, and Monika Rathod, "Weighted Localization in Vehicular Ad Hoc Networks Using Vehicle-to-Vehicle Communication"
[3] Alin-M. Cailean, Barthélemy Cagneau, Luc Chassagne, Suat Topsu, "Design and implementation of a visible light communications system for vehicle applications", November 2013.
[4] Shubham Chatterjee, Shalabh Agarwal, "Scope and Challenges in Light Fidelity(LiFi) Technology in Wireless Data Communication", June 2015.
[5] Akshata msonnad, anjana gopan, "Recent advancements in li-fi technology", Dec-2013
[6] Aman Sodhi, Jeslin Johnson, "Light Fidelity (LI-FI) - The Future of Visible Light Communication", March-April 2015.
[7] Mehboob raza haider, manoj mdongre, "Vehicle to vehicle communication using visible light communication technology".
[8] Ravi Prakash, Prachi Agarwal, "The New Era of Transmission and Communication Technology : Li-Fi (Light Fidelity) LED & TED Based Approach", February 2014.
[9] R.Karthika1, S.Balakrishnan, "Wireless Communication using Li-Fi Technology", March 2015.
[10] Riccardo Scopigno, Alessia Autolitano, "The Potential Benefits of On-Board Li-Fi for the Cooperation among Vehicles".