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# Vehicle to vehicle communication using LI-FI technology

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## ABSTRACT

LI-FI two vehicles are communicated with the help of LEDs bulbs with the help of transmitter and receiver circuit.LI-FI technology the road accident can be controlled and much human life can be saved. A very chip device called as ultrasonic sensor which is used to measure the distance is used here just to communicate the two vehicles when they comes in the contact in some range which is preferred for the ultrasonic sensor. Using this LI-FI the data are transmitted from one vehicle to another. This technology was introduced few years back, which needs more systematic enquiry on its sustainability for traffic control purpose. This concept can be implemented at very low cost and with higher efficiency. At present, the day to day activities use lot of LEDs based lights for illumination, which can also be used for communication because of the advantages like fast switching, high power efficiency and safe to human vision. We are find the distance and alert the vehicle using light source. LDR absorb the light source to transmit the controller. Reduce the accident because we are using control of vehicle move on same path. Ultrasonic sensors find the distance from the rear of the vehicle.

**Keywords:** LI-FI,Arduino,Vehicle to Vehicle communication

## INTRODUCTION

LI-FI is known as Light Fidelity communication systems. The technology works by adapting light emitting diode (LED's) send the digital type of information, invisible to the naked eye. We design prototype which is based on LIFI technology for vehicle to vehicle communication data transmission.vechicle to vehicle communication is most effective of solution that has been used in order to reduce accidents. Which is one of the most effective mechanisms that will implement in automobile to provide safety and a protocol of communication. LI-FI is a new way of wireless communication that uses LED lights to transmit data wirelessly. Transmission of data is one of the most important day to day activities in the fast growing world .LI-FI has got a much broader spectrum for transmission compared to conventional methods of wireless communications that LI-FI is a new way of wireless communication that uses LED lights to transmit data wirelessly. Transmission of data is one of the most important day to day activities in the fast growing world .LI-FI has got a much broader spectrum for transmission compared to conventional methods of wireless communications that relay on radio waves.

## LITERATURE REVIEW

1. Ambuj Kumar and Rajendea Prasad Nayak, Vehicular Ad-hoc Network (VANET) is a type of mobile communication in which topology changes dynamically due to high mobility of vehicles. Vehicles use two types of messages to update their status and to communicate with other vehicles. First is Periodic Safety Message (PSM) which gives us information about position, speed etc. and second is Event Driven Safety Message

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(ESM) which occurs when emergency situation like hard breaking, sudden lane change, etc. When vehicle movement is abnormal either due to change in speed or direction, vehicles generate event-driven safety alert messages. Safety alert messages are needed to be very fast and reliable for VANET applications. In this paper, we propose a novel approach to improve safety alert message communication in VANET using grouping of vehicles. Firstly, vehicles form a group and select their Group Leader to communicate with other Group Leaders. Secondly, we send the safety alert message by using priority in the messages and context-based communication. The priority is set according to various types of accidents and by using context-based communication the ESM messages are send to those groups which are endangered by the accidents. Simulation of proposed scheme is performed on multi-lane roads by considering vehicles movement in a single direction. Performance is evaluated in terms of packet delivery ratio and back-off counter for multi-hop broadcast communication [1-5].

2. Sok-Ian Sou and Ozan.K.Tonguz, The source vehicle that detects an accident can generate a warning message and propagate it to the following vehicles to notify other drivers before they reach the potential danger zone on the road. Recent studies have shown that sparse vehicle traffic leads to network fragmentation, which poses a crucial research challenge for safety applications.we 4 analyze and quantify the improvement in VANET connectivity when a limited number of roadside units (RSUs) are deployed and to investigate the routing performance for broadcast-based safety applications in this enhanced VANET environment. Even with a small number of RSUs, the performance in terms of the probability of network connectivity, the rehealing delay, the number of rehealing hops, and the message penetration time can be significantly improved in highway VANET scenarios.
3. Azzedine Boukerche vehicles communicate with each other and possibly with a roadside infrastructure to provide a long list of applications varying from transit safety to driver assistance and Internet access. Knowledge of the real-time position of nodes is an assumption made by most protocols, algorithms, and applications. But as VANets advance into critical areas and become more dependent on localization systems, GPS is starting to show some undesired problems such as not always being available or not being robust enough for some applications. For this reason, a number of other localization techniques such as Dead Reckoning, Cellular Localization, and Image/Video Localization has been used in VANets to overcome GPS limitations. A common procedure in all these cases is to use Data Fusion techniques to compute the accurate position of vehicles, creating a new paradigm for localization in which several known localization techniques are combined into a single solution that is more robust and precise than the individual approaches. We further discuss this subject by studying and analyzing the localization requirements of the main VANets applications. We then survey each of the localization techniques that can be used to localize vehicles and, finally, examine how these localization techniques can be combined using Data Fusion techniques to provide the robust localization system required by most critical safety applications in VANets. 5
4. [4]Isamu Takaioptical vehicle-to-vehicle (V2V) communication system based on an optical wireless communication technology using an LED transmitter and a camera receiver, which employs a special CMOS image sensor, i.e, an optical communication image sensor (OCI). The OCI has a “communication pixel (CPx)” that can promptly respond to light intensity variations and an output circuit of a “flag image” in which only high-intensity light sources, such as LEDs, have emerged. The OCI that employs these two technologies provides capabilities for a 10-Mb/s optical signal reception and real-time LED detection to the camera receiver. The optical V2V

communication system consisting of the LED transmitters mounted on a leading vehicle and the camera receiver mounted on a following vehicle is constructed, and various experiments are conducted under real driving and outdoor lighting conditions. Due to the LED detection method using the flag image, the camera receiver correctly detects LEDs, in real time, in challenging outdoor conditions.

5. G.Vidhya Krishnan, R.Nagarajan, T.Durka, M.Kalaiselvi, M.Pushpa, S. Shanmuga priya, The designs of a small-scale prototype of a vehicle to vehicle communication system using light fidelity (Li-Fi) technology. The new technology that was developed in the last few years, which still needs more investigations on its sustainability for outdoor vehicular networks. The vehicle to vehicle communication is the most effective solution that has been used in order to reduce vehicles accidents. The proposed use of Li-Fi technology comprises mainly lightemitting diode (LED) bulbs as means of connectivity by sending data through light spectrum as an optical wireless medium for signal propagation. In fact, the usage of LED eliminates the need of complex wireless networks and protocols. In this work, several case studies are, presents to mimicking the vehicle to vehicle communication. The numerical simulations are done by using proteous package and the experimental results are also presented. The proposed system gives better results in both simulation and hardware.
6. D.N.S. Ravi Kumar & G Nagarajan, The latest technology called as LIFI which has been developing a lot in few years. Using the concept of LI-FI two 6 vehicles are communicated with the help of LEDs bulbs with the help of transmitter and receiver circuit. With the help of this technology the road accident can be controlled and many human life can be saved. A very chip device called as ultrasonic sensor which is used to measure the distance is used here just to communicate the two vehicles when they comes in the contact in some range which is preferred for the ultrasonic sensor. Using this LI-FI the data are transmitted from one vehicle to another. The data that is transmitted through LIFI can be any data like audio, video or text. This technology was introduced few years back, which needs more systematic enquiry on its sustainability for traffic control purpose. This concept can be implemented at very low cost and with higher efficiency. The day to day activities use lot of LEDs based lights for illumination, which can also be used for communication because of the advantages like fast switching, high power efficiency and safe to human vision. Hence, this project presents about ecofriendly data communication between vehicle to vehicle through visible light which consists of the white LEDs that transmit audio signals to the receiver. The receiver circuit consists of solar panel connected with the amplifier and speakers to recover back the amplified version of original input signal. VLC has a bright future and it acts as a complement to the present RF communication by achieving higher efficiancy.

## EXISTING SYSTEM

The existing 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 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 display. The information will be received by the photodiode in vehicle 2 and compared to vehicle 2 speeds. 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 [6].

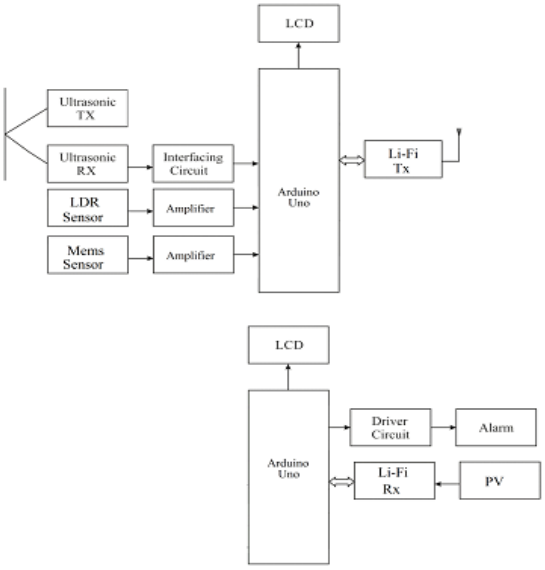
## DRAWBACK OF EXISTING SYSTEM

All the details of the road conditions from the first vehicle can be known only when the user is

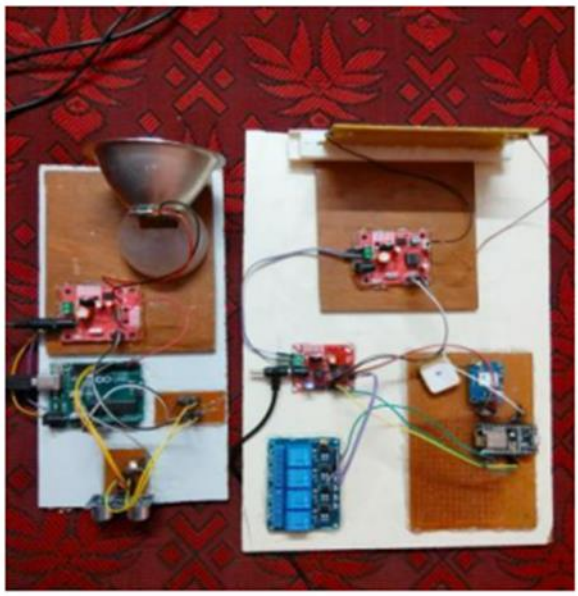
inside the car. The exact latitude & longitude parameters of the vehicle cannot be known.The challenges faced by WiFi in today's time are Capacity Availability Efficiency Security [7-9].

## PROPOSED SYSTEM

The proposed system can be used in where a smart traffic transportation system needed. It consists of transmitter, and the receiver. Vehicle to Vehicle data transmission through visible LED light Thus, installation cost and environmental effects are very less in this proposed system. Vehicle to vehicle communication is the most effective solution we have used in order to reduce accidents that comes on a daily news. In Li-Fi technology for vehicle-to-Vehicle data transmission we use LED light. In this technology there is elimination disappearance of protocols are used so in Li-Fi technology complexity is not too much. The aim of designing this system is highly reliable which will give any desired data transmission between transmitter and receiver mounted on the vehicle [10].

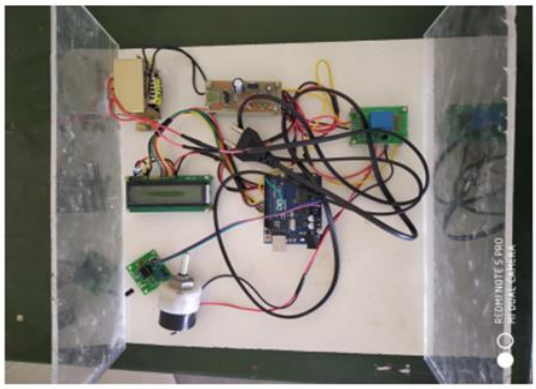



The LI-FI technology uses the light to transmit the data so that the space requirement is less. The System is controlled with Micro-controller that has been implemented using a Arduino uno and thus reducing the time wasted by the system. In this presented prototype, LI-FI brings the data transfer rate to a greater extent of value. It also consists of a LED and which is good but in this the speed of transmitting rate becomes higher which is its merit. This LI-FI in 2011 was developed and introduced in the consideration of WI-FI so the name is LI-FI only in this system used visible light instead of radio frequency. In order to compare the speed both the tech and to overcome with the jam of network let us consider that a Li-Fi/Wi-Fi hybrid down-link system model is considered. This hybrid network covers an particular indoor area by NC Li-Fi apps and a single Wi-Fi AP. In the scenario, users are uniformly distributed and move randomly. All of the aps are connected to a CU through error free inter-connection links. Each Li-Fi is a large light emitting diode (LED) lamp which contains many low power leds, and each user has a photo detector (PD).It is assumed that all of the pds are oriented perpendicular to the oar. The angle obtained by the system is irradiation is equal when compared to angle of incidence. The field of view (fov) of the LEDS can be designed so that the transmission can be contained within a certain space. The walls also sometimes block the light and make its intensity to be very low and interference between rooms.



Li-Fi is an emerging technology and has vast application. If this technology can be put into practical use, every bulb can be used like a wi-fi hotspot to transmit wireless data. This concept can be used to solve issues such as shortage of radio frequency bandwidth. Thus, this technology provides numerous benefits. By using this technology we can proceed towards a greener, safer and cleaner future. It is an advanced approach that will make our lives more technology driven in the near future.

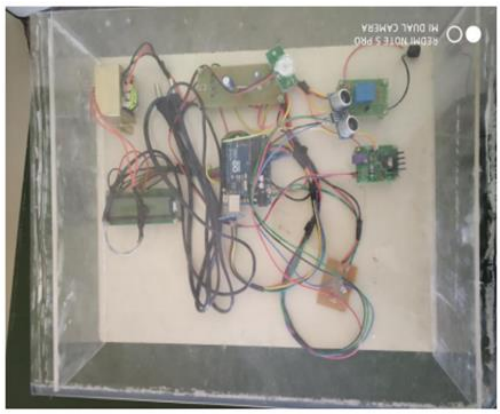
## RESULTS & DISCUSSION



Li-Fi technology may provide theoretically a speed of up to 10Gbps. Cost effective and more robust and useful than Wi-Fi. Li-Fi is not expected to completely replace Wi-Fi, but the two technologies could be used complementarily to create more efficient, green and future-proof access networks.

Data at terabits per second speeds more than 100 times the speed of Wi-Fi. Li-Fi technology has immense possibilities, from public internet access

through street lamps to auto-piloted cars that communicate through their headlights.



## CONCLUSION

The concept of Li-Fi has been introduced along with existing techniques and classical trends used for vehicle to vehicle communications. The proposed system has a cost effective solution to reduce accidents. The design of the system is clearly explained in this paper. The proof of concept has been illustrated in this paper by sending data through Li-Fi prototype model.

## REFERENCES

[1]. Jyoti Rani, PrernaChauhan, Ritika Tripathi, Li-Fi (Light Fidelity)-Thefuture technology In Wireless communication‖, International Journal ofApplied Engineering Research, ISSN 0973-4562 Vol.7 No.11 (2012).

[2]. Jay H. Bhut, Dharmrajsinh N. Parmar, Khushbu V. Mehta- LI-FI Technology – A Visible Light Communication, International Journal Of Engineering Development And Research ISSN: 2321-9939.

[3]. Rahul R. Sharma, Raunak, AkshaySanganal-Li-Fi TechnologyTransmission of data through light IJCTA 2014, ISSN:2229-6093 ,Vol 5 (1), 150-154.

[4]. Vitthal S Saptasagare- Next of Wi-Fi an Future Technology in Wireless Networking Li-Fi

[5]. Using Led Over Internet of Things, International Journal of Emerging Research in Management &Technology ISSN: 2278-9359 (Volume-3, Issue-3)(2014).

[6]. Shubham Chatterjee, Shalabh Agarwal, AsokeNathScope and Challenges in Light Fidelity(LiFi) Technology inWireless Data Communication , International Journal of Innovative Research in Advanced Engineering (IJIRAE) ISSN: 2349-2163Issue 6, Volume 2 (June 2015).

[7]. RevathiGanesan- Li-Fi Technology in Wireless Communication, INTERNATIONAL JOURNAL & MAGAZINE OF ENGINEERING, TECHNOLOGY, MANAGEMENT AND RESEARCH,ISSN No: 2320-3706

[8]. Anurag Sarkar, Prof. ShalabhAgarwal , Dr.Asoke Nath-Li-FiTechnology: Data Transmission through Visible Light, International Journal of Advance Research in Computer Science and Management Studies, ISSN: 2321-7782 Volume 3, Issue 6, June 2015

[9]. Akshit Aggarwal -COMPARATIVE STUDY: LI-FI V/S WI-FI , International Journal of Research & Development in Technology and Management Science –Kailash Volume - 21| Issue 1 | ISBN - 978-1-63102- 445-0 | March 2014

[10]. R.Karthika, S. Balakrishnan- Wireless Communication using Li-Fi Technology, SSRG International Journal of Electronics and Communication Engineering (SSRG-IJECE) volume 2 Issue 3 March 2015 ISSN: 2348