# LIFI BASED VEICHLE TO VEICHLE COMMUNICATION

**S. Prabakaran[1], P. Ram Kumar[2], S. Kowsalya[3]**
Department of Electronics and Communication,
CMS College of Engineering and Technology,
Coimbatore, India.

## ABSTRACT

Now days, traffic accident detection is becoming one of the interesting fields due to its tremendous application in intelligent transportation systems. Main causes behind these road accidents are lack of unskilled drivers, consuming alcohol while driving, over speed, sleep while driving. Plenty of solutions have been applied to prevent these road accidents. But most of them were failed to prevent this. In this paper we present an advanced accident detection using LIFI technology. This paper provides an intelligent system for accident prevention and detection for human life safety. That prevention part has various sensors like eye blink sensor, alcohol sensor and ultrasonic sensor. If the sensor detects whether the rider consumes alcohol or the distance between two vehicles is low then it sends that information to another vehicle which is going in front it. So that they can be alert. And if the driver is sleeping while driving means then the eye blink sensor detects it and give an alert to the driver.

## INDRODUCTION

It is wireless and uses visible light communication or infra-red and near ultraviolet (instead of radio frequency waves) spectrum, part of Optical wireless communications technology, which carries much more information, and has been proposed as a solution to the RF-bandwidth limitations. A complete solution includes an industry led standardization process.

As coined by Prof. Harald Haas during his TED Global talk, is bidirectional, high speed and fully networked wireless communications similar to Wi-Fi. Li-Fi is a subset of optical wireless communications (OWC) and can be a complement to RF communication (Wi-Fi or Cellular network), or a replacement in contexts of data broadcasting.

Visible light communications (VLC) works by switching bulbs on and off within nano seconds which is too quickly to be noticed by the human eye. Although Li-Fi bulbs would have to be kept on to transmit data, the bulbs could be dimmed to the point that they were not visible to humans and yet still functional. The light waves cannot penetrate walls which makes a much shorter range, though more secure from hacking, relative to Wi-Fi. Direct line of sight isn't necessary for Li-Fi to transmit a signal; light reflected off the walls can achieve 70 Mbps Li-Fi has the advantage of being useful in electromagnetic sensitive areas such as in aircraft cabins,

hospitals and nuclear power plants without causing Electromagnetic-Interference Both Wi-Fi and Li-Fi transmit data over the electromagnetic spectrum but whereas WiFi utilizes radio waves, Li-Fi uses visible light. While the US Federal Communications Commission has warned of a potential spectrum crisis because Wi-Fi is close to full capacity, Li- Fi has almost no limitations on capacity. The visible light spectrum is 10,000 times larger than the entire radio frequency spectrum. Researchers have reached data rates of over 10 Gbps, which is more than 250 times faster than superfast broadband Li-Fi is expected to be ten times cheaper than Wi-Fi. Short range, low reliability and high installation costs are the potential downsides.

Pure LI-FI demonstrated the first commercially available Li-Fi system, the Li-1st, at the 2014 Mobile World Congress in Barcelona. Bg-Fi is a Li-Fi system consisting of an application for a mobile device, and a simple consumer product, like an IoT (Internet of Things) device, with color sensor, microcontroller, and embedded software. Light from the mobile device display communicates to the color sensor on the consumer product, which converts the light into digital information. Light emitting diodes enable the consumer product to communicate synchronously with the mobile device.

## EXISTING SYSTEM

The existing system requires a transmitter and receiver in each vehicle in both rear and front sides of the vehicle. Thus more scenarios will be applicable. For the time being, we describe two scenarios that will be studied in the existing sytem. A message will be sent through the transmitter which is placed in rear lights to vehicle 2. Then 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 then displayed in vehicle 2 using LCD display .The information will be received by photodiode in vehicle 2 and compared to vehicle 2 speeds. If the 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.

## PROPOSED SYSTEM

The proposed system is carried out using LIFI technology. The LIFI system has been connected to each vehicle.  That li-fi system is used to transmit and receive information form a vehicle. Here, In this proposed system we have used various sensor like eye blink sensor, ultrasonic sensor, mems sensor and alcohol sensor. These sensor has been connected with a microcontroller to each vehicle. If the rider consumes alcohol then the alcohol sensor senses it and give that information to the nearest vehicle going in front of it through LIFI. Because while drunk and driving the rider may ride with over speed and it may hit the other vehicles which results accidents. The rider should follow a particular distance with other vehicle. When the vehicle really close to next vehicle then the ultrasonic sensor detects it and transmit that information through LIFI. This will help to reduce the accidents.  MEMS sensor senses axis of

the car, when there is a tilt in axis, it will send message. This MEMS sensor will help to detect in case of rash driving. And that information will be shared with the help of Li-Fi technology. Here, we used one more sensor called eye blink sensor that detects the drowsiness of a rider which could alert the driver before mishap happens. We have connected an alarm system for that. Here we have used a liquid crystal display to monitor all these parameters.

## ADVANTAGES

- Alcohol consumption has been detected.
- Vehicle to vehicle communication has been improved.
- Drowsiness of a rider can be detected and safety measures can be taken
- Li-Fi technology helps to communicate two microcontrollers with ease
- Engine speed can be controlled automatically
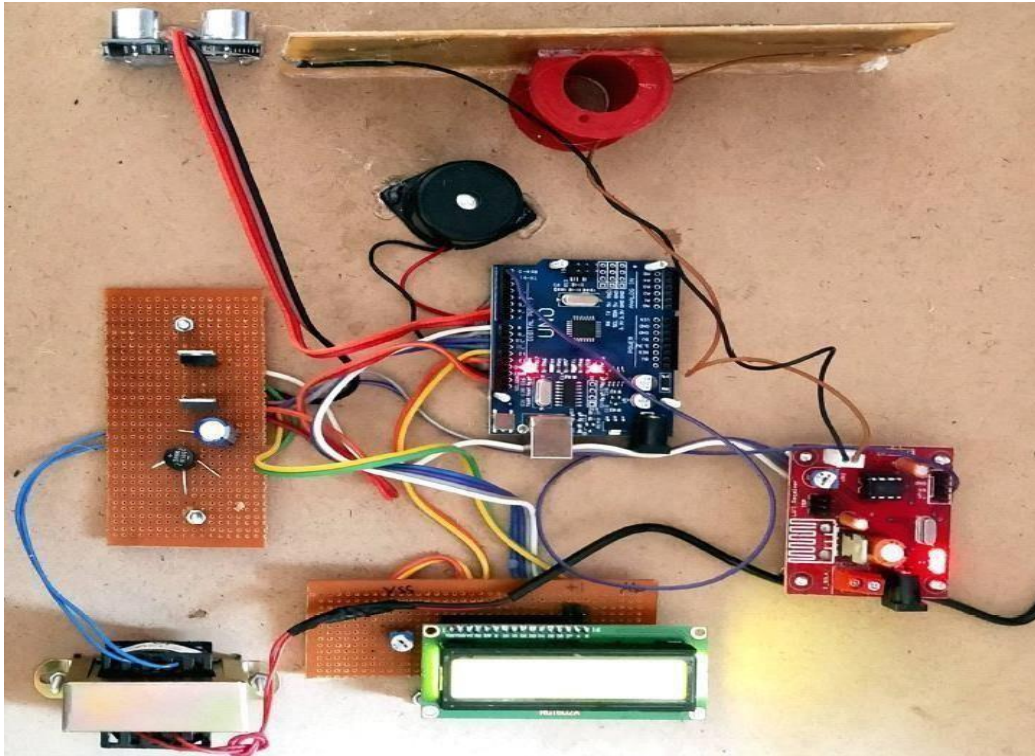- Accident occurrence detection is achieved

## BLOCK DIAGRAM - FRONT CAR
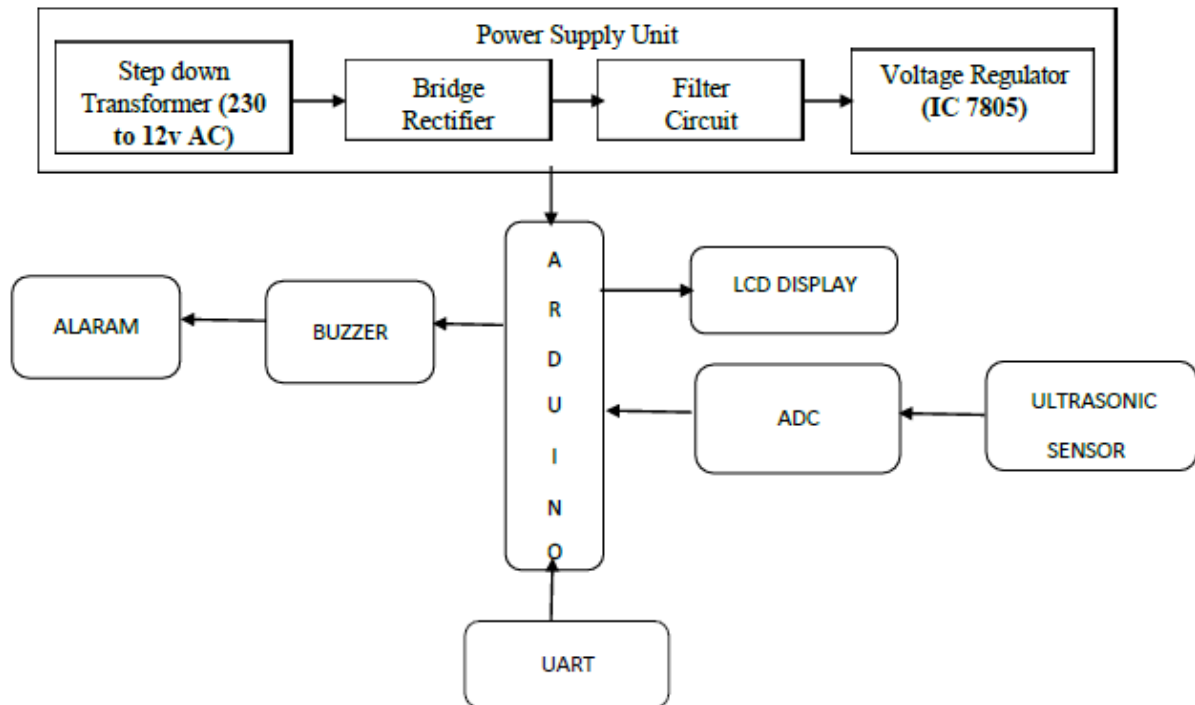
## BLOCK DIAGRAM – BACK CAR
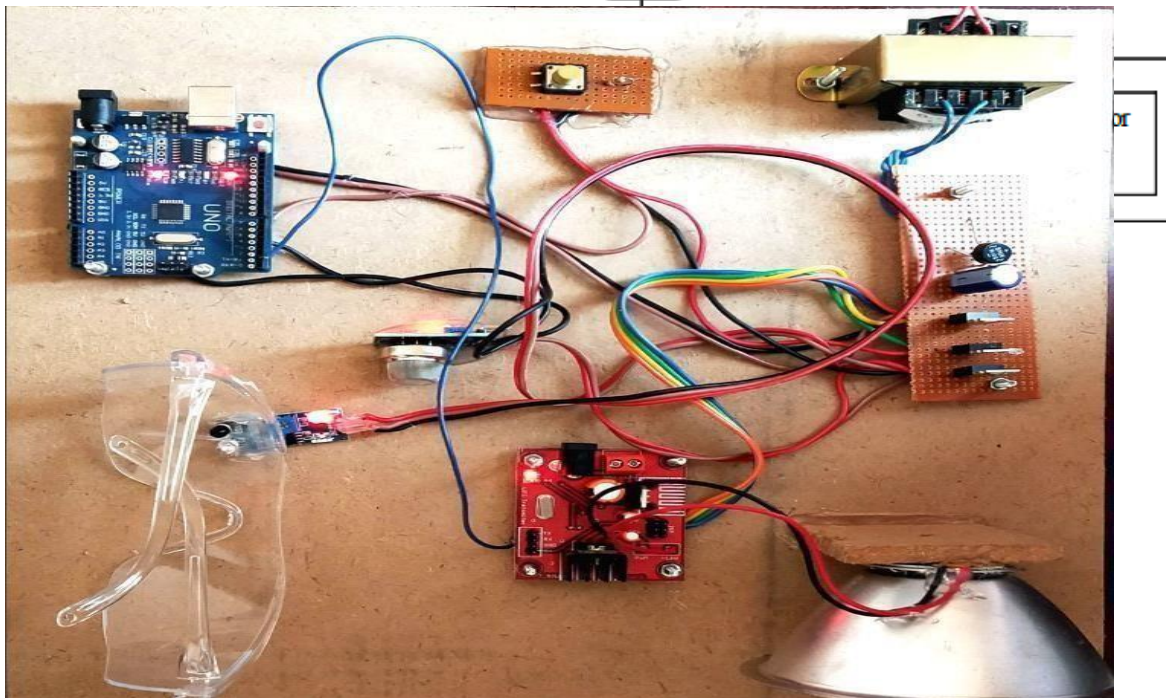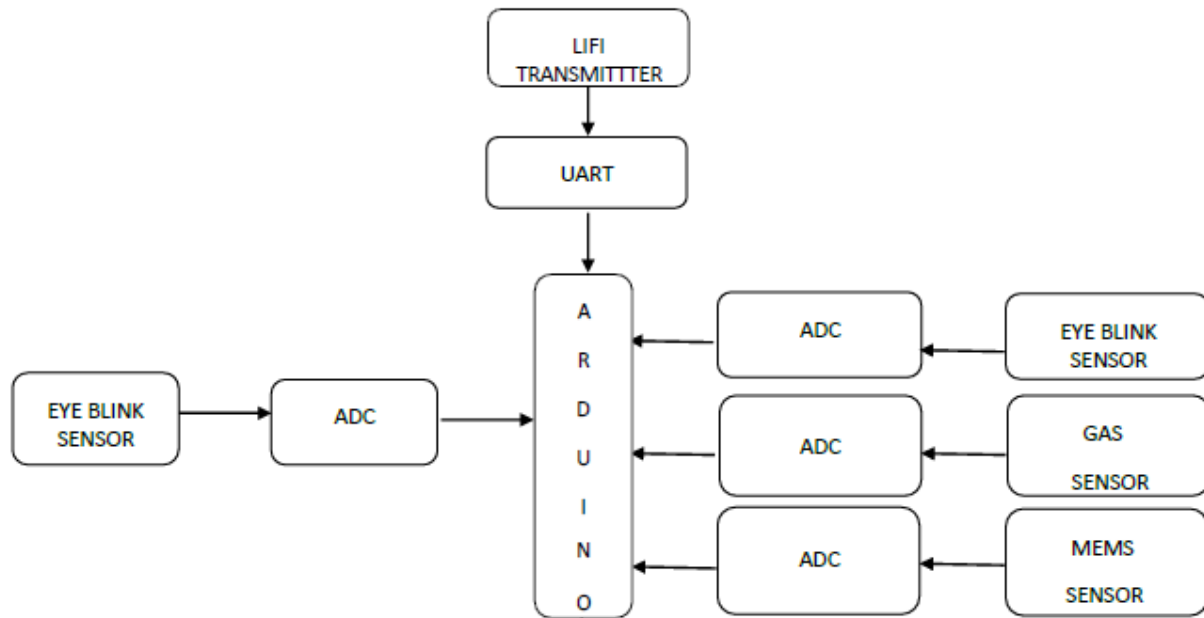


**EXPERIMENTAL SETUP - RECEIVER**

## RESULT AND DISCUSSION

As a result of increased population, the number of accidents also increased. This is reduced to a great extent by this technology. The Li-Fi helps faster transfer of data between the vehicles. This technology can also be implemented in street lights for data transfer about the traffic. As it employs visible light for communication, this is not restricted in any places. There is no interference in the signals. Hence this technology is far better than other methods of data transfer. It will allow inter access in places such as operation theatres and aircrafts where internet access is usually not allowed. If this technology can be used efficiently, we might soon have something of the kind of WI-FI hotspots wherever a light bulb is available. It will be cleaner and greener and the future of mankind will be safe. Since this technology has a vast potential, many researches are being conducted in this field. In this fast changing world as a result of increased population, the number of accidents also increased. This is reduced to a great extent by this technology. The Li-Fi helps faster transfer of data between the vehicles. This technology can also be implemented in street lights for data transfer about the traffic. As it employs visible light for communication, this is not restricted in any places. There is no interference in the signals. Hence this technology is far better than other methods of data transfer. It will allow inter access in places such as operation theatres and aircrafts where internet access is usually not allowed. If this technology can be used efficiently, we might soon have something of the kind of WI-FI hotspots wherever a light bulb is available. It will be cleaner and greener and the future of mankind will be safe. Since this technology has a vast potential, many researches are being conducted in this

field. In this method along with the distance measurement, drunkard drive indication and overtake guidance switch, the speed sensors can also be added to measure the speed of the cars.

**REFERENCE**

[1] A.Sarkar, S. Agarwal and A. Nath, "Li-Fi Technology: Data Transmission through Visible Light", International Journal of Advance Research in ComputerScience and Management Studies, Volume 3, Issue 6, June 2015.

[2] X. Yang, L. Liu, N. H. Vaidya, and F. Zhao. "A vehicle-tovehicle communication protocol for cooperative collision warning", The First Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services, MOBIQUITOUS 2004, pp. 114-123, IEEE, 2004.

[3] D.R. Kim, S. H. Yang, H.S. Kim, Y. H. Son and S. K. Han, "Outdoor Visible Light Communication for inter- vehicle communication using Controller Area Network", Fourth International Conference on Communications and Electronics (ICCE), IEEE, 2012.

[4]  P. Bhateley, R. Mohindra and S. Balaji, "Smart vehicular communication system using LiFi technology", International Conference on Computation of Power, Energy Information and Communication (ICCPEIC), IEEE, 2016.

[5] I.S. Santos and P.A.P. Ferraz, "Visible Light Communication Applied on vehicle-to-Vehicle Networks", International Conference on Mechatronics,
Electronics and Automotive Engineering (ICMEAE),  IEEE, 2015.

[6] O. Ergul, E. Dinc and O.B. Akan, "Communicate to illuminate: State-of-the art and research challenges for visible light communications", Physical Communication 17, pp. 72–85, 2015.

[7] I. Takai, K. Yasutomi, K. Kagawa, M. Andoh and S. Kawahito, "Optical Vehicle-to-Vehicle Communication System Using LED Transmitter and Camera Receiver", IEEE Photonics Journal, Volume 6, Number 5, October
2014.

[8] S. Nachimuthu, S.P. Chandran and B.S. Aarthi, "Design and Implementation of a Vehicle to Vehicle Communication System using Li-Fi Technology",International Research Journal of Engineering and Technology (IRJET), volume:03 Issue: 05, May 2016.