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# Inter-Vehicle Communication through V2V Using Li-Fi Technology

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***Abstract:*** *Now a days, automation and advancement in the system is implemented everywhere. Allthe automobile industries are working to compete with the others. Also there is much more advancement in technologies, which are commonly available in the vehicles. The facilities provided with the vehicles such as self-start, auto-gear, battery chargers, remote controls, etc are commonly provided with all the vehicles. Everyone uses his own vehicle for travelling and transportation as there is a vast development in the nearby areas of the cities. The road accidents in metropolitan areas as well as in countryside areas have increased to an uncertain level due to these developments. The system can also be implemented for the rescue of the accidentvictims. Many issues like arrival of ambulance, the investigations made by the police department and operating the victim bythe hospitals can be minimized by implementing the proposed system in every vehicle, including two wheelers, and four wheelers.*
***Keywords:*** *Li-fi,V2V,LED,Sensors, Buzzer*

## I.LITERATURE SURVEY

LI-FI is a new way of communication which uses light as a medium of transmission. LI-FI refers to light fidelity. It is also a faster and effective way of communication than a WI-FI. Light fidelity works by using light emitting diode for data transmission. In this paper a new design of data transmission based on light fidelity is shown.LI-FI uses visible light as a medium hence it can be called as anoptical version of WI-FI. This technology has data speed at the rate of terabits which is much faster compared to WI-FI. Spreadspectrum technique is used as a vehicle tovehicle communication previously. The major drawback of this technique is it requires driver's attention for control of speed. But in the proposed system the motor connected to the Controller senses the speed between the vehicles and automatically stops the vehicle Automation can be achieved as the distance between the vehicles reduces then the controller reacts and the motor speed is reduced. Intelligent transport system (ITS) using visible light communication with a transmitter and a receiver is given in. But the speed of this system is limited. The proposed technique modes of operation, its principles are presented in detail.

An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often withreal-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. Embedded systems control many devices in common use today. 98 percent of all microprocessors are manufactured as components of embedded systems.

Examples of properties typical of embedded computers when compared with general-purpose counterparts are low power consumption, small size, rugged operating ranges, and low per-unit cost. This comes at the price of limited processing resources, which make them significantly more difficult to program and to interface with. However, by building intelligence mechanisms on the top of the hardware, taking advantage of possible existing sensors and the existence ofa network of embedded units, one can both optimally manage available resources at the unit and network levels as well as provide augmented functionalities, well beyond those available. For example, intelligent techniques can be designed to manage power consumption of embedded systems.

## II.EXISTING SYSTEM

The use of vehicles increases in the proportion of the population. Due to the traffic congestion, the accidents are alsoincreasing day by day. This causes the loss of life due to the delay in the arrival ofambulance to the accident spot or from the accident spot to the hospital. So, it is necessary to take the accident victim to the hospital as soon as possible. Whenever, the accident is occurred, it has to be informed to the investigation unit. So, it is also beneficial if the intimation is reached to the enquiry section so that the time for the investigation can be minimized.

## III.PROPOSED SYSTEM

The PIR sensor can be deployed in the vehicles. Whenever the any human or animalspasses, the detection get sensed by PIR sensors and send the signal to the controller unit though Li-Fi, When accident occurs the driver will be un consitious stage means buzzer will be activated, and the value will beupdated through online for monitoring unit. When the uncertain event will be detectbuzzer will be activated. If switch gets pressed means system no operationperformed. At that time, it will be assumedthat the vibrations would be sensed due tominor crash by vehicle.

The main purpose behind this project is"DRIVER SAFETY". Now a days, many accidents are happening because of the alcohol consumption of the driver or the person who is driving the vehicle. Thus drunkdriving is a major reason of accidents in almost all countries all over the world.Alcohol Detector in Car project is designedfor the safety of the people seating inside the car. If alcohol detects means ignition system should be turn off. This project involves controlling accident due to unconscious through Eye blink. Here one Eye blink sensor is fixed in vehicle where if anybody looses conscious and indicate through buzzer module. If Ultrasonic sensor distance is low, front car owner will receive informationthrough Li-Fi module. Speed of the car will reduce.

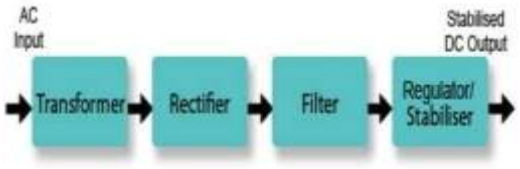
## IV.METHODOLOGY

**HARDWARE REQUIREMENT:**

- Power Supply
- Arduino UNO Microcontroller
- PIR Sensor
- Alcohol Sensor
- Ultrasonic Sensor
- Eye Blink Sensor
- Li-Fi
- Relay
- Buzzer
- LED,LCD Motor SOFTWARE REQUIREMENT:
- Embedded C
- Arduino IDE

**POWER SUPPLY UNIT:**

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU.




**ARDUINO UNO:**

Arduino Uno consists of 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

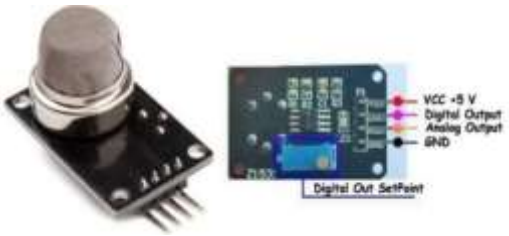
The Arduino Uno can be powered via theUSB connection or with an external powersupply. The power source is selected automatically. External (non-USB) power cancome either from an AC-to-DC adapter (wall-wart) or battery.

**PIR SENSOR:**

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. The modern world is filled with gadgets that get excited when they sense human motion.

**ALCOHOL SENSOR:**

Alcohol sensor is a chemical optical sensor utilizing the acidic nature of alcohol for detection. Alcohol Detector in Car project is designed for the safety of the people seating inside the car. If alcohol detects meansignition system should be turn off




**ULTRASONIC SENSOR:**

The principle of ultrasonic distance measurement used the already-known airspreading velocity, measuring the time from launch to reflection when it encountered obstacle, and then calculate the distancebetween the transmitter and the obstacle according to the time and the velocity.

The HC-SR04 ultrasonic sensor uses sonar to determine distance to an object like bats do. Itoperation is not affected by sunlight or black material like.It comes complete with ultrasonic transmitter and receiver module.

**EYE BLINK SENSOR:**

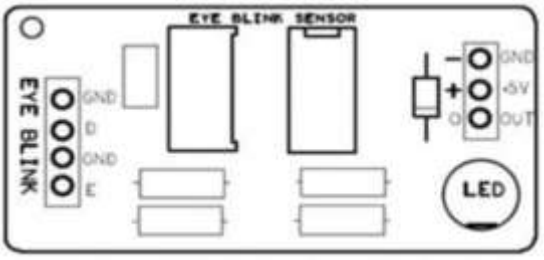
The eye-blink sensor works by illuminating the eye and/or eyelid area with infrared light, then monitoring the changes in the reflected light using a phototransistor and differentiatorcircuit.

Put Eye blink sensor glass on the face within 15mm distance, and you can view the LED blinking on each Eye blink.

The output is active high for Eye close andcan be given directly to microcontroller for interfacing applications.

**EYE BLINK OUTPUT:**

- 5V (High)→ LED ON When Eye is close.
- OV (Low) → LED OFF when Eye is open.




**LI-FI:**

Li-Fi technology is a ground-breaking light- based communication technology, which makes use of light waves instead of radio technology to deliver data. Using the visible light spectrum, Li-Fi technology can transmit data and unlock capacity which ist 10,000 times greater than that available within theradio spectrum.

**RELAY:**

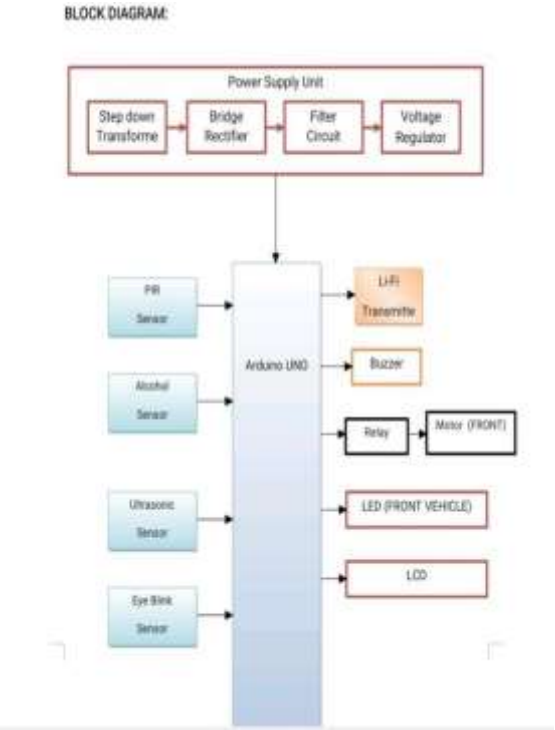
Relays are simple switches which are operated both electrically and mechanically. Relays consist of an electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet.

**BUZZER:**

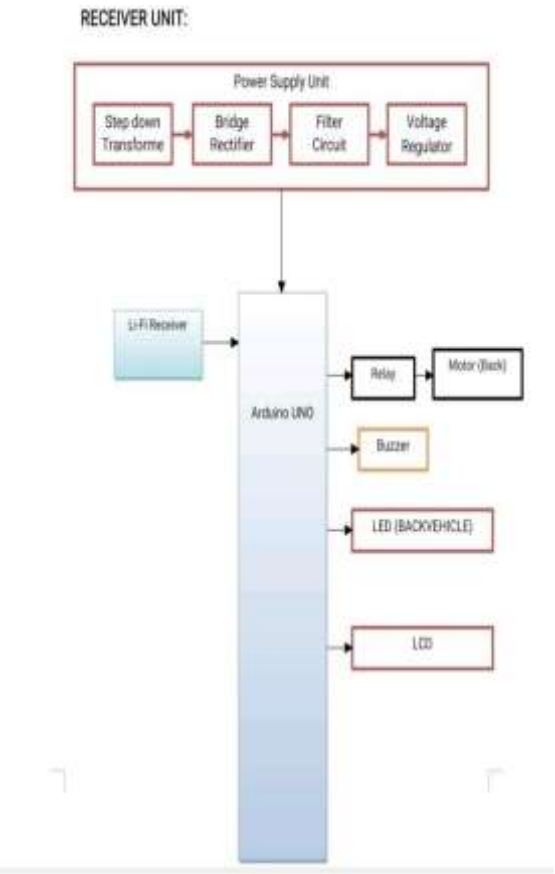
A buzzer or beeper is a signaling device, The word "buzzer comes from the rasping noise that buzzers made when they were electromechanical devices, operated from stepped-down AC line voltage at 50 or 60cycles. Other sounds commonly used to indicate that a button has been pressed are a ring or a beep

## V.BLOCK DIAGRAM:

LI-FI TRANSMITTER:




**LI-FI RECEIVER:**



**LED:**

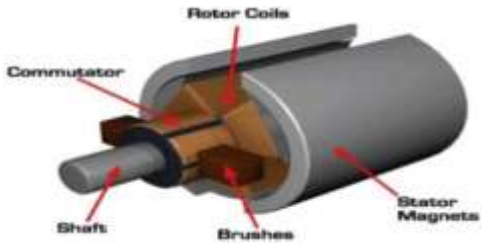
Light Emitting Diodes (LEDs) are the most widely used semiconductor diodes among all the different types of semiconductor diodes available today. Light emitting diodes emiteither visible light or invisible infrared light when forward biased. The LEDs. which emit invisible infrared light are used for remotecontrols

**LCD DISPLAY:**

Liquid crystal cell displays (LCDs) used to display of display of numeric and alpha numeric characters in dot matrix and segmental displays. They are all around us in laptop computers, digital clocks and watches, microwave, CD players and many otherelectronic devices.

**DC MOTOR:**

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields.




**DIGITAL INPUTS:**

It consists of 14 digital inputs/output pins,each of which provide or take up 40mA current. Some of them have special functions like pins 0 and 1, which act as Rx and Tx respectively, for serial communication, pins 2 and 3 which are external interrupts, pins 3,5,6,9,11 which provides output and pin 13 where LED is connected. It has 6 analog input/ output pins, each providing a resolutionof 10 bits. It provides reference to the analog inputs. It resets the microcontroller when low.

**STEPS TO PROGRAM:**

Programs written in Arduino are known as sketches. A basic sketch consists of 3 parts

1. Declaration of Variables.
2. Initialization: It is written in the setup()function.
3. Control code: It is written in the loop()function.

The sketch is saved with into extension. Any operations like verifying, opening a sketch,saving a sketch can be done using the buttons on the toolbar or using the tool menu.

The sketch should be stored in the sketchbookdirectory.

Choose the proper board from the tools menu and the serial port numbers.

Click on the upload button or chose upload from the tools menu. Thus the code isuploaded by the boot loader into the Microcontroller. It comes with an easy provision of connecting with the CPU of the computer using serial communication over USB as it contains built in power and reset circuitry.

## VI.BENEFITS OF DATA TRANSMISSION USING LI-FI:

- It reduces unwanted accident.
- It reduces criminal activities to carry drug/alcohol etc...
- Smart Work
- Efficiency is high
- User Friendly.

## VII.FUTURE ENCHANCEMENT:

LI-FI for smart traffic control can ensure quick, seamless communication between multiple vehicles as well as between the road infrastructure elements, such as traffic lights, signals, signboards, and vehicles, leading to a higher degree of safety. The communication between vehicles is enhanced, with no delayin data transmission, it can reduce road accidents. For example, if the lead car brakes suddenly, the information can be transmitted quickly to the trailing vehicle in real time.The second car's artificial intelligence system can automatically reduce the car's speed tomatch the speed of the first car without the driver's intervention.

## VIII.CONCLUSION:

In conclusion, the concept of Li-Fi had been introduced along with existing techniques andclassical trends used for vehicle to vehiclecommunications. This project proposed a newtechnique of communication between vehicleswhich is reliable and simple compared to existing ones and also cost efficient. The mainaim is to reduce accidents and to provide safer transportation which we have implemented in this system. LIFI technology makes vehicles to communicate with each other and prevents the accidents by applying the braking system. The results show the interface of vehicle to vehicle communication. Thus, the visiblelight communication was established whichtransmits data at the rate of terabytes and the hardware components gives the necessary results.

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