LI-FI BASED VEHICLE TO VEHICLE COMMUNICATION

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Abstract: Traffic accident detection is becoming one in every of the interesting fields because of its tremendous application in intelligent transportation systems. the most causes behind these road accidents are lack of unskilled drivers, consuming alcohol while driving, speed, and sleep while driving. many solutions are applied to forestall these road accidents. But most of them didn't prevent this. during this work, we present advanced accident detection using LIFI technology. This work provides an intelligent system for accident prevention and detection for human life safety. That prevention part has various sensors just like the nictation sensor, alcohol sensor, and ultrasonic sensor. If the sensor detects whether the rider consumes alcohol or the gap between two vehicles is low then it sends that information to a different vehicle that moving into front of it. so they will be awake and if the driving force is sleeping while driving, the attention blink sensor detects it and alerts the driving force.

1.1 INTRODUCTION

Li-Fi might be a derivative of optical wireless communications (OWC) technology, which uses light from light-emitting diodes (LEDs) as a medium to deliver network, analogous manner visible radiation communications (VLC) works by switching the current to the LEDs off and on at a very high speed, too quick to be noticed by the human eye, thus, it doesn't present any flickering. Although Li-Fi LEDs would should be kept on to transmit data, they could be dimmed to below human visibility while still emitting enough light to carry data. this may be also a major bottleneck of the because it's restricted to the illumination purpose and not ideally Li-Fi may be a derivative of optical wireless communications (OWC) technology, which uses light from light-emitting diodes (LEDs) as a medium to deliver network, same manner actinic ray communications (VLC) works by switching this to the LEDs off and on at a extremely high speed, too quick to be noticed by the human eye, thus, it doesn't present any flickering. Although Li-Fi LEDs would should be kept on to transmit data, they could be dimmed to below human visibility while still emitting enough light to carry data. this will be also a big bottleneck of the technology when supported the spectrum, because it's restricted to the illumination purpose and not ideally adjusted to a mobile communication purpose. Technologies that permits as roaming between various Li-Fi cells, also called handover, may allow to a seamless transition between Li-Fi.It is wireless and uses nonparticulate radiation communication or infra-red and near ultraviolet (instead of oftenness waves) spectrum, a component of Optical wireless engineering, which carries rather more information and has been proposed as a solution to the RF-bandwidth limitations. an entire 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 the identical as Wi-Fi. Li-Fi is also a subset of optical wireless communications (OWC) and should be a complement to RF communication (Wi-Fi or

Cellular information broadcasting. Pure LI-FI demonstrated the primary commercially available Li-Fi system, the Li-1st, at the 2014 Mobile World Congress in Barcelona. Bg-Fi is additionally a Li-Fi system consisting of an application for a mobile device, and a straightforward 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 colour sensor on the patron product,adjusted to a mobile communication purpose. Technologies that permits as roaming between various Li-Fi cells, also called handover, may allow to a seamless transition between Li-Fi.It is wireless and uses electromagnetic radiation communication or infra-red and near ultraviolet (instead of oftenness waves) spectrum, a part of Optical wireless engineering, which carries rather more information and has been proposed as an answer to the RF-bandwidth limitations. a full 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 the identical as Wi-Fi. Li-Fi is additionally a subset of optical wireless communications (OWC) and should otherwise be a complement to RF communication (Wi-Fi or Cellular information broadcasting. Pure LI-FI demonstrated the primary commercially available Li-Fi system, the Li-1st, at the 2014 Mobile World Congress in Barcelona. Bg-Fi is additionally 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 which converts the sunshine into digital information. Light emitting diodes enable the patron product to talk synchronously with the mobile device

1.2 LITERATURE REVIEW

"Outdoor actinic radiation Communication for inter-vehicle communication using Controlled Area Network" was done by D. R. Kim [3]. This paper has highlighted vehicle to a vehicle communication system that doesn't require a tracking global positioning System or maybe a Wi-Fi or 3G wireless connectivity. it absolutely was proposed to use Programmable Interface Controller (PIC) sonar which sends a 40 KHz short pulse of sound that's undetectable by the human ear. The echo of the signal are going to be detected by the microcontroller. the space is calculated by the time required for the echo signal to be transmitted and received. This paper , "Optical Vehicle-

to-Vehicle Communication System using LED Transmitter and Camera Receiver" was done by I. Takai. This paper discussed to develop a cheap yet inexpensive mechanism for the vehicle to a vehicle which is light. Recently, semiconductor diode (LED) based optical systems are developed. Especially, an OWC technology using actinic ray communication (VLC), has been receiving much attention. The LED is suitable as an optical- signal-sending device because the sunshine intensity of the LED is modulated at high speed as compared with traditional lighting devices, like incandescent bulbs and fluorescent lamps. Furthermore, LEDs are inexpensive, already used for lighting and sign-ages, and have high energy efficiency and long operating life. This research paper, "Visible light communication appliedon vehicle-to-vehicle networks" was done by I.S.Santos.This paper discussed a low-cost Vehicle-to-vehicle Communication (V2V) using the concept of visible radiation Communication (VLC). during this research paper," A vehiclThis paper, "Outdoor actinic ray Communication for inter-vehicle communication using Controlled Area Network" was done by D. R. Kim [3]. This paper has highlighted vehicle to a vehicle communication system that doesn't require a tracking global positioning System or maybe a Wi-Fi or 3G wireless connectivity. it had been proposed to use Programmable Interface Controller (PIC) sonar which sends a 40 KHz short pulse of sound that's undetectable by the human ear. The echo of the signal are detected by the microcontroller. the space is calculated by the time required for the echo signal to be transmitted and received. This paper , "Optical Vehicle-to-Vehicle Communication System using LED Transmitter and Camera Receiver" was done by Takai. This paper discussed to develop an inexpensive yet inexpensive mechanism for the vehicle to a vehicle which is light. Recently, diode (LED) based optical wireless communication (OWC) systems are developed. Especially, an OWC technology using actinic radiation communication (VLC), has been receiving much attention. The LED is suitable as an optical- signal-sending device because the sunshine intensity of the LED is also modulated at high speed compared with traditional lighting devices, like incandescent bulbs and fluorescent lamps. Furthermore, LEDs are inexpensive, already used for lighting and sign-ages, and have high energy efficiency and long operating life. This research paper, "Visible light communication appliedon vehicle-to-vehicle networks" was done by I.S.Santos.This paper discussed a low-cost Vehicle-

protocol for cooperative collision warning" was done by X. Yang. Emerging wireless technologies for vehicle-to-vehicle (V2V) and vehicle-to-roadside (V2R) communications like DSRC are promising to dramatically reduce the number of fatal roadway accidents by providing early warnings. One major technical challenge addressed during this paper is to comprehend low latency in delivering emergency warnings in various road situations. supported a careful analysis of application requirements, we design an efficient protocol, comprising congestion control policies, service differentiation mechanisms, and methods for emergency warning dissemination. Simulation results demonstrate that the proposed protocol achieves low latency in delivering emergency warnings and efficient protocol for cooperative collision warning" was done by X. Yang. Emerging wireless technologies for vehicle-to-vehicle (V2V) and

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1.3RESEARCH METHODOLOGY

The Research methodology is meted out using LIFI technology. The LIFI system has been connected to every vehicle.That li-fi system is employed to transmit and receive information form a vehicle.Here, during this proposed system we've got used various sensor like nictitation sensor, ultrasonic sensor, mems sensor and alcohol sensor. These sensor has been connected with a microcontroller to every vehicleIf the rider consumes alcohol then the alcohol sensor senses it and provides that information to the closest vehicle getting in front of it through LIFI. Because while drunk and driving the rider may ride with over speed and it's going to hit the opposite vehicles which ends accidents.The rider should follow a selected distance with other vehicle. When the

vehicle really near next vehicle then the ultrasonic sensor detects it and transmit that information through LIFI,

DC motor in details that has been discussed during this article. so as to grasp the operating principle of dc motor we want to first examine its constructional feature. Where α is that the angle between the plane of the armature turn and therefore the plane of reference or the initial position of the armature which is here along thethere could be a tilt in axis, it'll send message. This mems sensor will help to detect just in case of rash driving. which information are shared with the assistance of lifi technology.Here, we used yet one more sensor called reflex sensor that detects the drowsiness of a rider which could alert the motive force before mishap happens. we've connected an device for that.Here we've got used a liquid display to watch all theseparameters. ESP32 could be a series of low-cost, low-power system on a chip microcontrollers with integrated Wi-Fi and dual-mode Bluetooth. ESP32 is formed and developed by Espressif Systems, a Shanghai-based Chinese company, and is manufactured by TSMC using their 40 nm process. it's a successor to the ESP8266 microcontroller. Features of ESP32 Microcontroller. CPU: Xtensa dual-core (or single-core) 32-bit LX6 microprocessor, operating at 160 or 240 MHz and functioning at up to 600 DMIPS. Ultra low power (ULP) co-processor Memory: 320 KiB ROM. the primary slave connected to a temperature sensor LM35. This senses the temperature of an engine and provides the amount of temperature. The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has a plus over linear temperature sensors calibrated in Kelvin, because the user isn't required to subtract an oversized constant The universal asynchronous receiver/transmitter (UART) takes bytes of information and transmits the individual bits in a very sequential fashion.[1] At the destination, a second UART re-assembles the bits into complete bytes. Each UART contains a register, which is that the fundamental method of conversion between serial and parallel forms. significant importance for the industry today, and is equally important for engineers to appear into the working direction of field. The presence of the term cosα within the torque equation okay signifies that unlike force the torque in the

least position isn't the identical Fleming's manus rule says that if we extend the forefinger, finger and thumb of

Fig.1 MOTOR CONSTRUCTION

our paw in such how that the present carrying conductor is placed in a very force field (represented by the index finger) is perpendicular to the direction of current(represented by the center finger), then the conductor experiences a force within the direction (represented by the thumb) mutually perpendicular to both the direction of field and also the current within the conductor. For clear understanding the principle of DC motor we've to see the magnitude of the force, by considering the diagram below. This dual bidirectional motor driver, relies on the very
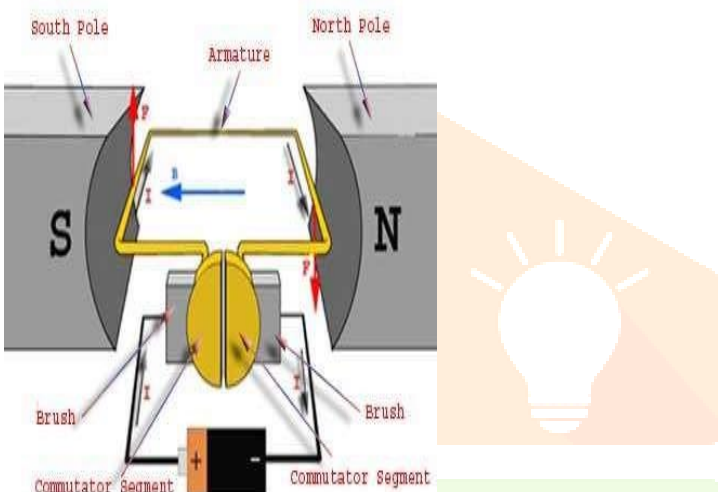
talked-about L298 Dual H- Bridge Motor Driver computer circuit. The circuit will allow you to simply and independently control two motors of up to 2A each in both
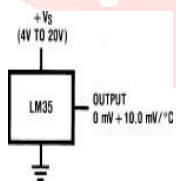

directions. it's ideal for robotic applications and similar temperament for connection to a microcontroller requiring just a pair of control lines per motor.

The LM35 doesn't require any external calibration or trimming to produce typical accuracies of ±1⁄4°C at temperature and ±3⁄4°C over a full −55 to +150°C temperature range. The LM35's low output impedance, linear
Fig.2 BUZZER

output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It will be used with single power supplies, or with plus and minus
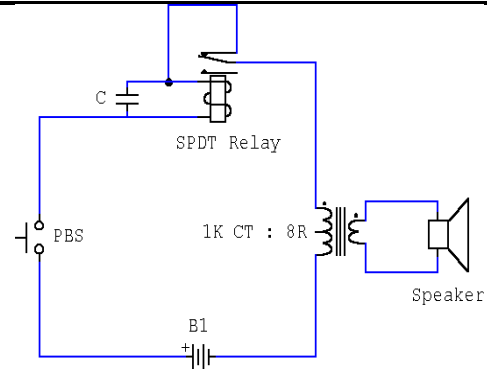
supplies. because it draws only 60 μA from its supply, it's very low self-heating, but 0.1°C in still air. The LM35 is rated to control over a −55° to +150°C temperature range, while the LM35C is rated for a −40° to +110°C range The LM35 series is on the market packaged in hermetic TO-46 transistor packages, while the LM35C, LM35CA, and LM35D also are available within the plastic TO-92 transistor package. The LM35D is additionally available in an 8-lead surface mount small outline package and a plastic TO-220 package
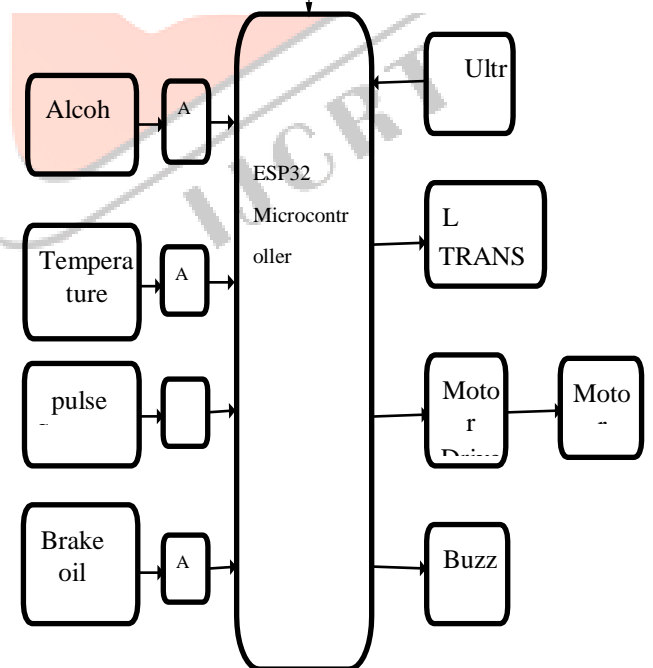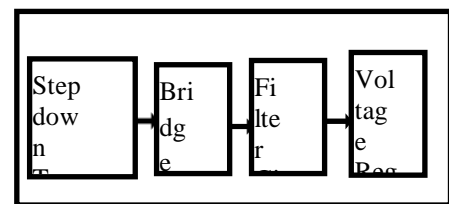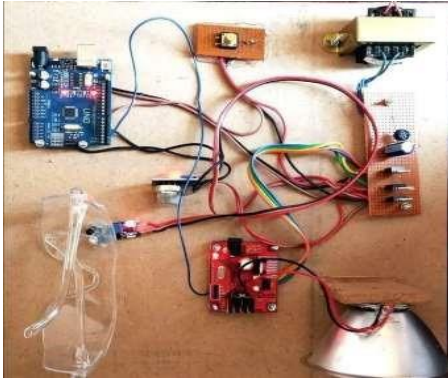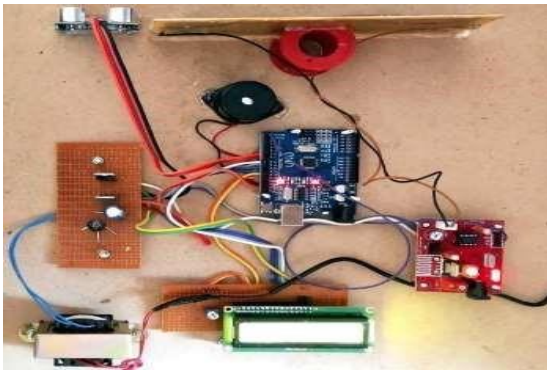

Fig.3 FRONT CAR

OUTPUT IMAGES

*1.*TRANSMITTER

RECEIVER

V. RESULTS AND DISCUSSION

As a results of increased population, the quantity of accidents also increased. this is often reduced to a good extent by this technology. The Li-Fi helps faster transfer of information between the vehicles. This technology also can be implemented in street lights for data transfer about the communication, this is often not restricted in any places. there's no interference within the signals. Hence this technology is way better than other methods of places like operation theatres and aircrafts where internet access is typically not allowed. If this technology may be used efficiently, we would soon have something of the sort of WI-FI hotspots wherever a light-weight bulb is out there. it'll be cleaner and greener and also the way forward for mankind will be safe.

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