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VEHICLE-TO-VEHICLE COMMUNICATION USING LI-FI TECHNOLOGY

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Aim: The aim of this project is to establish vehicle-to-vehicle (V2V) communication using Li-Fi (Light Fidelity) technology, enabling high-speed, secure, and reliable data exchange between vehicles for improved road safety and traffic management.

Objectives:

The project's objectives include:

- Li-Fi Infrastructure Development: Create a robust Li-Fi infrastructure that can be integrated into vehicles, allowing them to transmit and receive data using visible light communication.
- Real-time Data Exchange: Enable real-time data exchange among vehicles, including information on speed, position, road conditions, and potential hazards.
- Enhanced Road Safety: Improve road safety by facilitating instant communication between vehicles, helping to prevent accidents and reduce traffic congestion.
- Traffic Management: Develop algorithms and protocols for efficient traffic management, such as dynamic traffic signal control and congestion avoidance.
- Security and Reliability: Ensure the security and reliability of V2V communication to protect against data breaches and ensure the accuracy of transmitted information.

Problem Statement:

The project addresses the following challenges: Traffic Congestion: Growing traffic congestion in urban areas leads to delays and accidents. Current vehicle communication systems are limited in their ability to address these issues.

Road Safety: Road accidents are a significant concern. Timely communication between vehicles can help in avoiding collisions and improving overall road safety.

Data Transfer Speed: Existing V2V communication technologies may not provide the required data transfer speed for real-time applications, such as collision avoidance.

Interference and Line of Sight: Li-Fi technology relies on visible light, which can be affected by obstacles and weather conditions. Overcoming these challenges is essential.

In summary, this project aims to leverage Li-Fi technology to establish V2V communication with the goal of addressing traffic congestion, enhancing road safety, and improving the overall efficiency of transportation systems, while also tackling technical challenges related to data speed and signal reliability.

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ABSTRACT
This paper presents the latest technology called as LI-FI which has been developing a lot in few years. Using the concept of LI-FI two vehicle 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. 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. 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 efficiency.

OVERVIEW:
There are around 1.4 million cell pole radio waves base stations set, with more than 5 billion cell phones. Cell phones transmit over 600TB of information on a normal reason for consistently. Presently a days remote correspondence utilize radio waves. Yet, radio waves have an issue of effectiveness, accessibility, security and limit. Range is significant necessity for remote correspondence. With headway in innovation and increment in number of clients, existing radio wave range neglects to address the issue and consequently, the limit issue. To determine all the issues, we have concocted the idea of transmitting information remotely through light utilizing LEDs, called as Li-Fi which is a most recent innovation that utilizes LED lights which helps in the transmission of information considerably more quicker, and adaptable due to the sturdiness, effectiveness and high life time attributes that makes Li-Fi idea a superior one. Driven lights are these days generally utilized for individual and authority purposes for their radiant viability improvement.

INTRODUCTION
There are around 1.4 million cell pole radio waves base stations set, with more than 5 billion cell phones. Cell phones transmit over 600TB of information on a normal reason for consistently. Presently a days remote correspondence utilize radio waves. Yet, radio waves have an issue of effectiveness, accessibility, security and limit. Range is significant necessity for remote correspondence. With headway in innovation and increment in number of clients, existing radio wave range neglects to address the issue and consequently, the limit issue. To determine all the issues, we have concocted the idea of transmitting information remotely through light utilizing LEDs, called as Li-Fi which is a most recent innovation that utilizes LED lights which helps in the transmission of information considerably more quicker, and adaptable due to the sturdiness, effectiveness and high life time attributes that makes Li-Fi idea a superior one. Driven lights are these days generally utilized for individual and authority purposes for their radiant viability improvement. Obvious light correspondence (VLC) is another method for remote correspondence utilizing noticeable light. Common transmitters utilized for noticeable light correspondence are obvious light LEDs and recipients are photodiodes and picture sensors. Being a profoundly populated nation like India and parcel of traffic issues, there is constantly an issue of manual traffic control at whatever point an emergency vehicle shows up along a specific course which isn't powerful. The proposed system aims in using lifi for transmission of data through led light between two vehicles which

helps in reducing road accident and promotes safe driving. Vehicle-to-Vehicle (V2V) communication plays a significant role in enhancing road safety, improving traffic efficiency, and enabling advanced vehicle functionalities. As technological advancements continue to transform the automotive industry, novel communication technologies are being explored to facilitate efficient and reliable V2V communication. One such technology is Li-Fi (Light Fidelity), which utilizes light signals for wireless data transmission. Li-Fi technology offers several advantages for V2V communication. By leveraging the existing headlights and taillights of vehicles, Li-Fi can enable vehicles to exchange real-time data about their position, speed, and direction. This information sharing allows for proactive hazard detection, collision avoidance, and cooperative driving scenarios. Moreover, Li-Fi's high-speed data transmission capability enables rapid and reliable communication between vehicles, contributing to improved road safety and traffic management. However, the implementation of Li-Fi-based V2V communication faces various challenges. These challenges include line-of-sight limitations, environmental interference, range and scalability issues, data security concerns, and the need for standardization and interoperability. Overcoming these challenges requires robust technological solutions and collaborative efforts among automotive manufacturers, infrastructure providers, and regulatory bodies. This paper aims to explore the potential of Li-Fi technology for V2V communication. It discusses the benefits, limitations, and challenges associated with Li-Fi-based V2V communication. Additionally, it presents possible solutions and future directions for the effective deployment of Li-Fi technology in the automotive industry. By addressing these aspects, this paper contributes to the understanding of Li-Fi-based V2V communication and its potential to revolutionize the way vehicles communicate and collaborate on the road. Overall, Li-Fi technology holds promise as a viable communication solution for V2V communication. By harnessing the power of light signals, it opens up new possibilities for improving road safety, traffic efficiency, and the overall driving experience. Through continued research, development, and collaboration, Li-Fi-based V2V communication can pave the way for a smarter and safer transportation ecosystem. Vehicle-to-Vehicle (V2V) communication is a critical aspect of modern transportation systems, aiming to improve road safety, traffic efficiency, and overall driving experience. As technological advancements continue to shape the automotive industry, innovative communication technologies are being explored to enable seamless and effective V2V communication. One such technology that holds promise in this context is Li-Fi (Light Fidelity). Li-Fi technology utilizes light signals for wireless data transmission, offering several advantages over traditional radio-based communication systems. Li-Fi can leverage the existing infrastructure of vehicles, such as headlights and taillights, to transmit and receive data, making it a cost-effective solution for integrating V2V communication capabilities. The core principle of Li-Fi is the modulation of light intensity to encode information. By rapidly modulating the light emitted by the vehicle's lights, data can be transmitted to nearby vehicles equipped with Li-Fi receivers. This enables vehicles to exchange vital information, including position, speed, acceleration, and road conditions, in real-time, facilitating cooperative driving and proactive hazard detection. Li-Fi technology offers numerous benefits for V2V communication. Firstly, it can provide high-speed and reliable data transmission, allowing for near-instantaneous communication between vehicles. Secondly, Li-Fi operates in the visible light spectrum, which is unregulated and offers abundant bandwidth for data transmission. This provides the potential for large-scale deployment and avoids the congestion issues associated with other wireless communication systems. Moreover, Li-Fi-based V2V communication can enhance road safety by enabling vehicles to create a dynamic and comprehensive situational awareness of their surroundings. By sharing real-time information, vehicles can anticipate and respond to potential hazards, preventing accidents and reducing collision risks. Additionally, Li-Fi technology can contribute to smoother traffic flow, congestion management,

and optimized route planning, leading to improved traffic efficiency and reduced travel times. Despite its potential, Li-Fi-based V2V communication also faces challenges. The line-of-sight requirement for light signals limits its effectiveness in scenarios where obstacles obstruct the transmission path. Environmental factors such as bright sunlight or heavy fog can also affect signal quality. Furthermore, standardization, interoperability, and data security concerns need to be addressed to ensure seamless integration and protect the privacy of transmitted data. In conclusion, Li-Fi technology presents an exciting opportunity for V2V communication in the automotive industry. By harnessing light signals, it offers high-speed, reliable, and cost-effective communication capabilities that can significantly improve road safety, traffic efficiency, and driving experiences. While challenges exist, ongoing research and development efforts are focused on addressing these limitations and advancing Li-Fi-based V2V communication towards widespread adoption. With continued progress, Li-Fi has the potential to revolutionize the way vehicles communicate and cooperate on the road, paving the way for a smarter and safer transportation ecosystem.

LITERATURE REVIEW

- **Harald Haas, Liang Yin, Cheng Chen , Stefan Videv, Damian Parol, Enrique Poves, Hamada Alshaer, Mohamed SufyanIslim ," Introduction to indoor networking concepts and challenges in LiFi", IEEE/OSA Journal of Optical Communications and Networking (Volume: 12 , Issue: 2 , February 2020)**

  Wireless communication has become a basic utility in our day to day life such that it becomes a fundamental of our lives and this communication uses the radio spectrum for data transfer. There are issues in using the radio spectrum they are capacity, efficiency, availability and security. The usage of Wi-Fi also causes damage to the ecosystem such as flora and fauna. The defects of the Wi-Fi technology has given birth to the concept of Li-Fi (Light Fidelity) technology. Li-Fi is an advanced technology. This project is concise to vehicle to vehicle communication for avoiding road accidents. We use the ultrasonic sensor, gas sensor, vibration sensor, LCD display , Li-Fi transmitter and receiver. In case of an abnormal condition in the front vehicle, the vehicle at the back will be intimated and will stop on the second. For future enhancement, Li-Fi can be implemented in class rooms where data stored in the server is transmitted through LED lights attached in the ceilings of the classroom and the data can be received through Li-Fi receiver(dongle) which is present with each student in theclassroom. The goal of the project is to reduce the consequences of accidents in our daily lives and to prevent automobile collisions. There are a variety of reasons for such a bad situation that leads to death or disability. This involves a driver's rapid lack of concentration, braking failure, and loss of stability. Li-Fi is an advanced technology. This project is focused on vehicle-to-vehicle communication in order to prevent traffic accidents. We use ultrasonic sensor, vibration sensor, LCD display, Li-Fi transmitter and receiver. In case of an abnormal condition in the front vehicle, the vehicle at the back will be intimated and will slow the speed on the second vehicle. Many automakers are currently focusing on developing automobiles with IoT capabilities, including health care,accident prevention, vehicle safety, driver safety, driver and passenger comfort, vehicle monitoring, etc. In this project we focused on developments in driver's drowsiness and comfort monitoring. If driver is not alert for obstacles or in front of vehicles then the speed of engine will decreased through LIFI technology and the engine speed will slowdown to stop condition and the project having alert system such as

buzzer to intimate through sound. This project would be giving in- depth knowledge on recent developments in the field of automotive.

- **Harald Haas, Liang Yin, Yunlu Wang, Cheng Chen," What Is LiFi?", Journal of Lightwave Technology (Volume:34, Issue:6, March15,2016).** This paper attempts to clarify the difference between visible light communication (VLC) and light-fidelity (LiFi). In particular, it will show how LiFi takes VLC further by using light emitting diodes (LEDs) to realise fully networked wireless systems. Synergies are harnessed as luminaries become LiFi attocells resulting in enhanced wireless capacity providing the necessary connectivity to realise the Internet-of-Things, and contributing to the key performance indicators for the fifth generation of cellular systems (5G) and beyond. It covers all of the key research areas from LiFi components to hybrid LiFi/wireless fidelity (WiFi) networks to illustrate that LiFi attocells are not a theoretical concept any more, but at the point of real-world deployment. DUE to the increasing demand for wireless data communication, the available radio spectrum below 10 GHz (cmwave communication) has become insufficient. The wireless communication industry has responded to this challenge by considering the radio spectrum above 10 GHz (mm-wave communication). However, the higher frequencies, f, mean that the path loss, L, increases according to the Friis free space equation ($L \propto f^2$). In addition, blockages and shadowing in terrestrial communication are more difficult to overcome at higher frequencies. As a consequence, systems must be designed to enhance the probability of line-of-sight (LoS), typically by using beamforming techniques and by using very small cells (about 50 m in radius). The need for small cells is not an issue from a system capacity perspective. This is because reducing cell sizes has without doubt been the major contributor for enhanced system performance in current cellular communications. This means, contrary to the general understanding, using higher frequencies for terrestrial communication has become a practical option. However, one disadvantage is that the challenge for providing a supporting infrastructure for ever smaller cells becomes significant. One such example is the provision of a sophisticated backhaul infrastructure. Light-fidelity (LiFi) [1], [2] is a continuation of the trend to move to higher frequencies in the electromagnetic spectrum. Specifically, LiFi could be classified as nm wave communication. LiFi uses light emitting diodes (LEDs) for high speed wireless communication, and speeds of over 3 Gb / s from a single micro-light emitting diode (LED) [3] have been demonstrated using optimised direct current optical orthogonal frequency division multiplexing (DCO-OFDM) modulation [4]. Given that there is a widespread deployment of LED lighting in homes, offices and streetlights because of the energy-efficiency of LEDs, there is an added benefit for LiFi cellular deployment in that it can build on existing lighting infrastructures. Moreover, the cell sizes can be reduced further compared with mm-wave communication leading to the concept of LiFi attocells [5]. LiFi attocells are an additional network layer within the existing heterogeneous wireless networks, and they have zero interference from, and add zero interference to, the radio frequency (RF) counterparts such as femtocell networks. A LiFi attocell network uses the lighting system to provide fully networked (multiuser access and handover) wireless connectivity. This paper is an extension of an invited paper [6] at European Conference on Optical

Communication 2015. It takes a broader view in order to appropriately define LiFi, and to contrast it to well-established related concepts such as visible light communication (VLC). To the authors' best knowledge, along with [6] this is the first time that such clarification is provided. Therefore, the papers starts by discussing key research areas that are relevant to LiFi. The areas that VLC and LiFi have in common such as digital modulation techniques are addressed in a tutorial manner, while the areas that are unique to LiFi are discussed in more detail and technical solutions are provided and discussed in sufficient depth in order to support the results provided therein. Because of the deliberate breadth of this paper and the limited space, the interested reader will also be provided with references for a more in-depth study of the techniques discussed in this paper. The rest of the paper is structured as follows: In Section II, the key differences between VLC and LiFi are discussed. A summary of state-of-the-art modulation techniques used in LiFi systems is provided in Section III. In Section IV, the first LiFi transmitter and receiver application-specific integrated circuits (ASICs) components are introduced. In Section V, an important element of a full LiFi network, namely multiuser access techniques are discussed. In Section VI, LiFi attocell networks are modelled, including the consideration of co-channel interference (CCI). In Section VII, hybrid LiFi and WirelessFidelity (WiFi) networks are analysed and it is shown that both systems can gain from each other

- **MOSAIF Afaf, RAKRAK Said "An Indoor Wireless Visual Sensor Network basing on Light-Fidelity Communication",2017 International Conference on Wireless Networks and Mobile Communications (WINCOM).** This Essay discusses the most recent technology, known as LI-FI, which has seen significant growth over the years. With the use of transmitter and receiver circuits and LED bulbs, two vehicles can communicate using the LI-FI idea. This technology makes it possible to control traffic accidents and save a great number of lives. The two cars only communicate when they come into touch within a certain range, which is desired for the ultrasonic detector, which is a real-life chip device used to assess distance. Data are exchanged from one vehicle to another via tis LI-FI Any type of data can be transferred with LI-FI. Almost 5 billion mobile phones are connected to approximately 1.4 million cell, poll radio waves base stations. On a regular basis and regularly. Cell phones send more than 600TB of data. Nowadays, radio waves are used form remote correspondence. Yet there are limitations, accessibility, security and efficiency issues with radio waves. For remote correspondence, range is a crucial need. With advances in technology and an increases in the number of customers, the problem is addressed by the current radio wave range, which leads to came up with the idea of transmitting information remotely through the light using LEDs or LI-FI. LI-FI is a relatively new invention that makes use of LED lights to speed up the transmission of information technology. Another technique for remote correspondence that makes use of observable light is obvious light correspondence (VLC). Clear light LEDs are frequently used as transmitters for visible light communication, and photodiodes and image sensors are frequently used as recipients. India is highly popular country with significant traffic problems, thus there is always problem with human traffic management if any emergency vehicle appears along a particular, in effective route. The suggested system proposes to use LI-FI for data transmission between two

vehicles via led lights, which reduces traffic accidents and encourages safe driving.

- **Niharika Mishra, Monika Rai, RiyaMandal, HarjeetKaur."Navigation System using Light Fidelity" 2018 2nd International Conference on Trends in Electronics and Informatics (ICOEI).**
  We are striving to build a system that will transmit pre-accident information to the vehicle, allowing the vehicle to avoid an accident, in this project. The designs and findings of a basic prototype of a vehicle-to-vehicle communication system based on light fidelity (Li-Fi), a unique technology developed in recent years, were investigated. One of the most effective strategies for decreasing car accidents is vehicle-to-vehicle communication. The proposed application of Li-Fi technology in this project primarily uses light-emitting diode (LED) bulbs as a mode of connectivity, with data delivered over the light spectrum as an optical wireless channel for signal propagation. In consequence, LED lighting eliminates the requirement for a complicated wireless network protocol. Li-Fi is a widely used and vital communication technology. Li Fi stands for light fidelity communication systems. It is an incredibly fast and low-cost wireless communication system that is the optical equivalent of Wi-Fi. The method transmits digital data that is invisible to the naked eye using light emitting diodes (LEDs). We build a prototype for vehicle-tovehicle data transmission utilising Li-Fi technology in this project. The most efficient strategy of preventing automobile accidents has been demonstrated to be vehicle to vehicle communication. In LI-Fi technology, the LED is used as a light source for data transfer via light. Vehicle to vehicle communications, for example, is one of the earliest developments. It was formerly used to replace or update existing wireless technology. to quickly restore high-speed connectivity (in case of disaster problem). LiFi is employed because it is an optical version of Wi-Fi that is speedy and affordable. LiFi technology will allow us to connect to the internet using light from lamps, streetlights, or LED televisions. Not only is it less expensive, safer, and faster than wifi, but it also eliminates the need for a router. Simply point your phone or tablet at a light bulb to access the internet. LiFi (light fidelity) is a two-way wireless technology that transmits data using LED or infrared light. Unlike wifi, which utilises radio frequency to convey an internet signal, LiFi technology uses light waves to transmit an internet signal. This is a significant improvement over today's wireless networks. It increases the bandwidth and speed of wifi, 3G, and 4G connections. These have a finite capacity and become saturated as the number of users surfing grows, causing them to crash, slow down, or even disconnect. However, LiFi's band frequency of 200,000 GHz is 100 times faster than wifi's 5 GHz limit and can transmit significantly more data per second. When the best wifi could only manage 300 Mbit/s, a 2017 study by the University of Eindhoven used infrared light with a radius of 2.5 metres to reach a download rate of 42.8 Gbit/s. Harald Haas, a director professor at the University of Edinburgh's LiFi Research and Development Centre, invented the technology, which could be available in our homes in a few years. It is currently being tested with LED luminaires in offices around the world, and the aerospace industry is already looking for ways to incorporate it into aeroplanes. Other places where LiFi technology could become popular include airports, hospitals, and city streets. According to the Global Market for LiFi Technology Analysis and

Forecast 2018-2028, the growth of mobile devices and the growing demand for greater bandwidth systems will drive the development of this social technology in the coming decade. According to this analysis, the global market will be worth almost $36 billion in 2028, with a compound annual growth rate of 71.2 percent over the next ten years. Up to 2028, the Asia-Pacific area will dominate global growth in LiFi technology, surpassing Europe, which held the lead in 2017.

- **Jaina Patel , Pranati Trivedi , Drashti Patel,"A Performance Analysis of "Light Fidelity" and "Internet of Things" & It's Application", 2017 International Conference on Transforming Engineering Education (ICTEE)**

  In today various diseases are increasing, with this a doctor treat such large number of people deteriorates and also the task to monitor them regularly is painstaking. However we can overcome this problem to a certain extend with the help of newly emerged technology of LIFI and IOT. LIFI or Light Fidelity invented by Prof. Harald Hass of University of Edin burgh and IOT proposed by Kevin Ashton, provide us with one such technology using which a doctor can keep record of his/her patient from anywhere across the world. Since doctor has to stay updated with his patient noninterfering connectivity which is possible by LIFI and this huge data of patient n be recorded and stored using cloud computing IOT. Once the doctor receives data, he can analyze them and provide appropriate feedback to the person (nurse) who is currently operating the patient. Now a days, two new technological terms have evolved which has created a lot of buzz, namely LIFI and IOT. The idea of LIFI or Light Fidelity was first proposed by Professor Harald Hass of University of Edinburgh in his 2011 TED Global talk. [2]Whereas the term "the Internet of Things" (IOT) was coined by Kevin Ashton of Procter & Gamble, later MIT's Auto-ID Center, in 1999. LIFI has the prospective to be notably faster than the current wireless fidelity systems and thus can turn everyday led lamps into a wireless internet access points. [2]Pure-LIFI continues to work on miniaturizing the technology, improving the power efficiency, and enhance the speed, and so we expect to see this technology evolve beyond dongles to be integrated into devices like smart phones in the next few years. Lighting is impeccably arranged to provide/yield sensor data and be the backbone for data collection. However, what if there was more information to provide? [2]As lighting will provide a backbone for data collection, it can also provide an infrastructure for data dispersion. Li-Fi (Light Fidelity) can convert a collection infrastructure into a truly dynamic network and so for this we use Internet of Things. Here we present a novel implementation of the amalgamation, of these technologies to provide a better Health Monitoring System. Ideally, a doctor is supposed to provide services at both the government and private hospitals. However the number of patients are increasing day by day, due to increase in population, so to make doctor his Health Monitoring System. Here since we are using visible light spectrum (lifi), it will not cause any interference in operation theaters, ICU or other devices present in the patientroller unit will take the patient d it on a website using internet provided by LIFI and store it using IOT. The doctor who might be anywhere across the globe, is given access to this website, he will analyze the data and givenecessary feedback to the nurse currently operating the patient. This way a doctor be mandatory when the patient is in the recovering stage and has no complications. Similarly, when a patient suddenly gets an attack or something the

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doctor will be warned immediately,since the patient website. This way the doctor can quickly come and visit thepatient, if the problem could not be solved by providing necessary feedback to the nurse. Moreover by this method, a patient with not so serious problem such as a diabetic-A patient, will not have to visit the doctor regularly, his measuring device will directly upload the information about the patientdesigned that doctor has complete flexibility to access his both the patient - the government hospitals and the public hospitals.

EXISTING SYSTEM

Beam alignment between a lens-based receiver with a small field of view (FOV) for high optical gain and a light-emitting diode (LED)-based transmitter is one of the major issues for the vehicular visible light communication (VLC) system. Received Due to the fact that a mobile receiver's optical intensity is subject to large variations, detection and alignment of the beam are delayed. The most effective way to in this case, received optical intensity for high signal-to-noise ratio real-time trajectory tracking of light sources in paper Experiments are conducted using a prediction function based on the Kalman filter. for dynamic VLC applications, which have been built and proven. The location-based receiver attitude is adjusted using a two-axis gimbal. A wide field of view (FOV) transmitter, which a fast camera. It has been successfully designed and demonstrated for dynamic VLC to use a real-time light source alignment system with a trajectory prediction function based on the Kalman filter. applications. When using a two-axis for changing the mindset, mbal a receiver's ability to align a beam of light, its the alignment deviation was the recommended method was both simulation and experiment have confirmed this. As there are variations practical cameras for the light source in the frame rate the gimbal control delay changes over time as a result of detection. In order to lessen the impact of the variable delay in the identification and alignment of the light source, an adaptive control A speed planning model based on an S-shape was used to Kalman filter-based trajectory prediction can be used to enhance alignment performance.

PROPOSED SYSTEM

Wherever a smart traffic transportation system is required, the proposed technology can be used. It is made up of two parts: the transmitter and the receiver. Data transmission from vehicle to vehicle using visible LED light. As a result, the suggested system's installation costs and environmental impacts are minimal. Vehicle-to-vehicle communication has proven to be the most effective method for reducing the number of accidents reported on a daily basis. LED light is used in Li-Fi technology for vehicle-to-vehicle data transmission. Because the protocols that are utilized in this technology are being phased out, Li-Fi technology is not overly complex. The goal of this system's design is for it to be extremely dependable, allowing any necessary data flow between the vehicle's transmitter and receiver.

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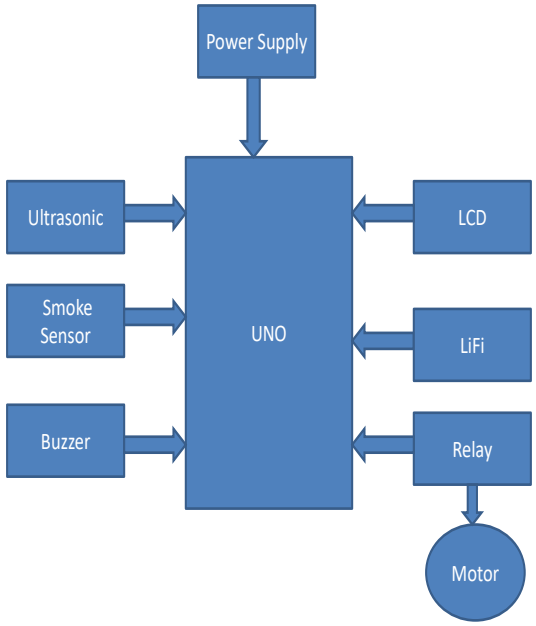

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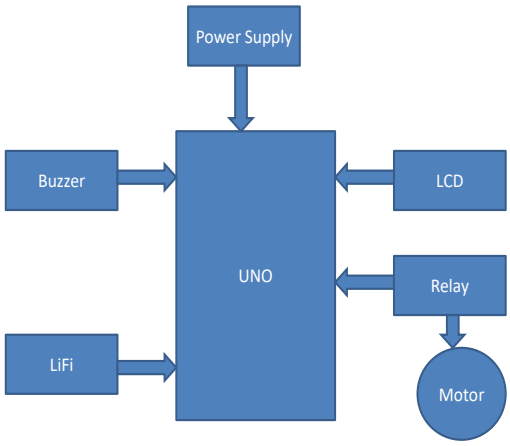

CONCLUSION

Our system's goal is to use light to connect automobiles to one another. Here, the Arduino transmitter is used to produce the light. The transmitter's light from the second vehicle is captured by the receiver. The recipient's output of light intensity determines the length of the vehicle. Measure the separation between side obstructions and the vehicle using the ultrasonic sensors. This kind of vehicle is very affordable and simple to maintain. The vehicle distance is precise, and the success rate is also high. We use light as a transmitting medium so it is non-radiative and environmentally benign. Despite the fact that this system uses Li-Fi technology and anticipates the front-end vehicle.

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