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 ijrset@gmail.com

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Vehicle Detection and Collision Avoidance System in Hairpin Curves Using Li-Fi Technology

Mrs. R Anjana Devi¹, Karthikeyan V², Dhinesh N³, Kabilan V⁴

Associate Professor, Dept. of Electronics and Communications Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India¹

U.G. Student, Dept. of Electronics and Communications Engineering, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India^{2,3,4}

ABSTRACT: In the world, the Republic of India ranks top in avenue accidents. Principally road accidents rectangular measure prompted because of High pace or as soon as the cause force isn't mindful of the opposite automobiles coming lower back contrary thereto particularly within the deep curves. Such types of curves are known as hairpin curves. The driver can't without difficulty observe the car coming on the contrary direction. This system works nicely all through the day but there are no advantageous facilities for the duration of the night. Placing the signals at every aspect of the curves will assist us to solve the problem. The usage of the sensor is that if the car is 5 meters away from the curve the sensor sends the sign to the car coming on the contrary direction. In this framework, we can avoid an increased wide variety of accidents frequently at the deep curves. Reducing the rate of accidents increases the well-being of a person. In addition to this, we also display the longitude and latitude cost of the car displayed in the terminal software.

KEYWORDS: Li-Fi Technology, Collision avoidance system, Vehicle detection.

I. INTRODUCTION

Roadways will have the most grade that a car or truck can traverse. The zigzag factor of the photo above minimizes the grade or steepness of the roadway. If you have ever ridden a bike up a steep hill, you would possibly have discovered yourself zigzagging lower back and forth across the roadway to get up the hill. The same precept applies here. When designing a roadway, there are pointers as to the length of the radius of the curve primarily based particularly on the design speed. The quicker the design's speed, the longer the radius of the curve. Truck traffic is an essential thing in the diagram criteria for the minimum radius of curvature. Turning templates are used to determine if a truck can make the turn except too a great deal tracking. A bend in a road with a very acute internal angle, making it necessary for an oncoming car to turn nearly 180° to continue on the road. Such turns in ramps and trails may also be referred to as switchbacks in American English. While driving on roads at hairpin section, many drivers face accident which consequences in them into serious injuries or even death. The principal motive at the back of this accident is the curves and bends of roads while turning in Ghats. It will become tough to see cars coming from other lanes and turning drivers usually have to expect away for turning at such a critical area this creates an extraordinary threat of lifestyles every other reason for an accident in the hairpin part is that solely one automobile can turn at turnings at a time. If two vehicles come face to face while turning, it creates a chance of accidents and it turns hard to handle. At night, due to no streetlights, it will become a tough venture of driving on hairpin bends and especially whilst turning. It becomes tougher at night to make a turn as automobile coming from any other side of the road is no longer seen due to darkness.

II. EXISTING METHOD

There is no current science that is used to keep away from accidents in the hairpin bends areas. Only convex lenses in the vehicles are used to see what is coming which is inadequate to keep away from accidents in hairpin bends. We comprehend that "Objects in the Mirror are closer than they appear". As you can see the signboards are the extant measures to point out the drivers about the curves and hairpin curves.



III. PROPOSED METHOD

The task has been designed to prevent an accident by collision. This task proposes the concept to minimize the accidents and supply safety measuring methods in hairpin curves the usage of sensors, which detects the boundaries inside meters range of the vehicle the usage of ultrasonic sensors. If a vehicle is at meters from the curve, then the sensor will automatically experience the vehicle and offers the signal to the driver coming in the opposite cars with a li-fi device. Here we using Ultrasonic & IR sensors, which are positioned on the roadside of the hairpin bend. The ultrasonic sensor is used to measure the vehicle distance and the IR sensor is used for detecting the nearest vehicle to our vehicle. Our sensors and li-fi transmitter are mounted by the side of the uphill section of the road, similarly, the vehicle aspect li-fi receiver is mounted and located inside the vehicle to display the contrary vehicle effortlessly the use of a li-fi receiver. If the car is detected capacity automatically shows the vehicle distance and longitude and latitude values will be displayed in the terminal software.

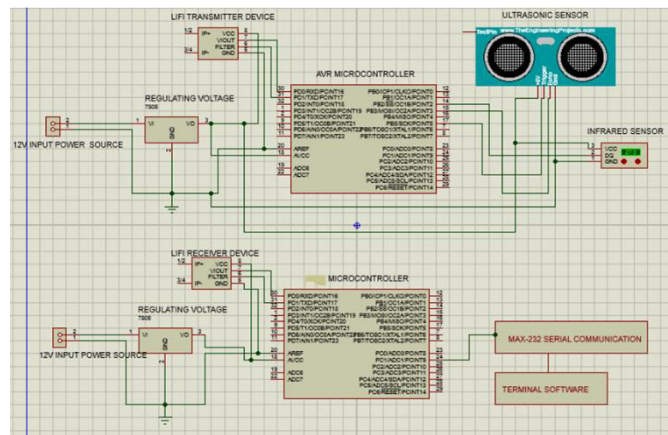
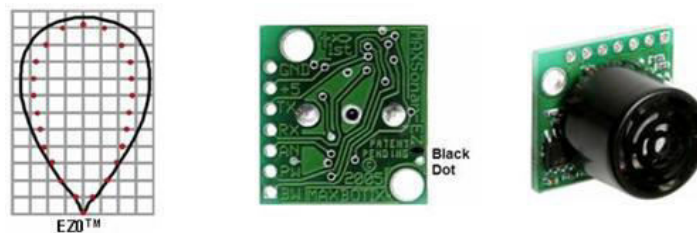


Figure 1: Circuit diagram

IV. METHODOLOGY



Figure 2: Ultrasonic Sensor























LV-MaxSonar [®] -EZ beam patterns	EZ0™	EZ1™	EZ2™	EZ3™	EZ4™
Detection pattern to a 1/8 inch diameter dowel.					
Detection pattern to a 1/4 inch diameter dowel.					
Detection pattern to a 1 inch diameter dowel.					
Detection pattern to a 3 1/4 inch diameter dowel. = 5V = 3.3V V= supply voltage (Distances measured on a 1 foot grid)					

Figure 3: LV-Max Sonar

V. FLOW CHART

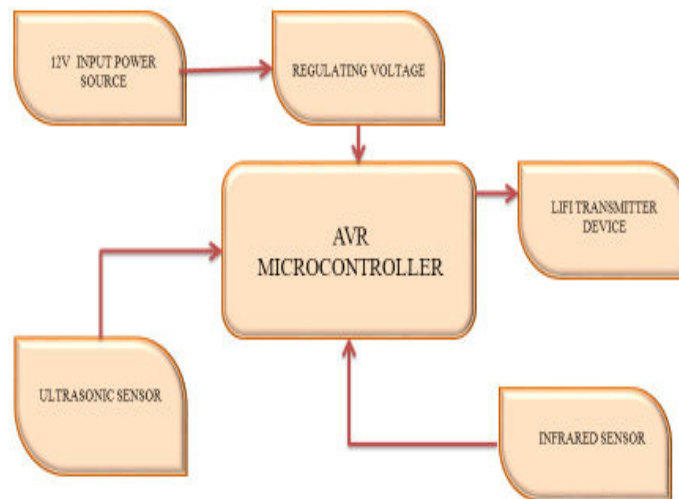


Figure 4: Flow chart of transmitter

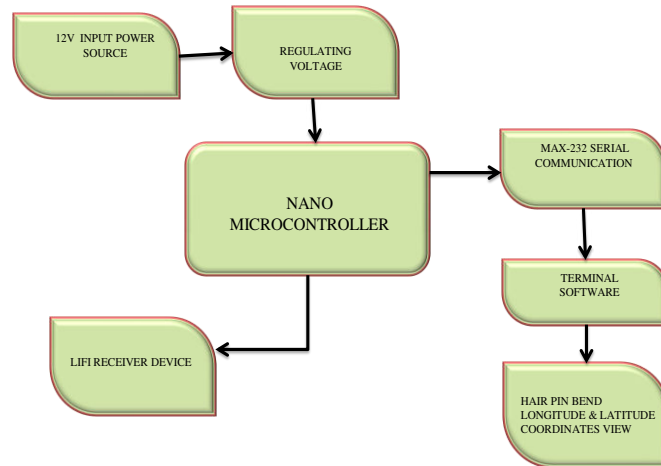
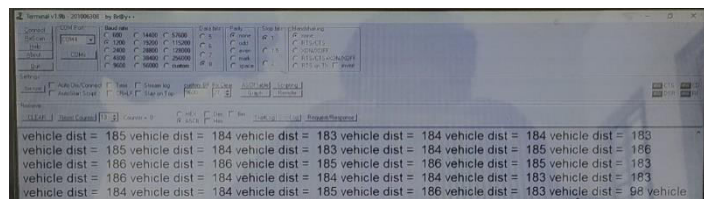


Figure. 7 Flow chart of receiver

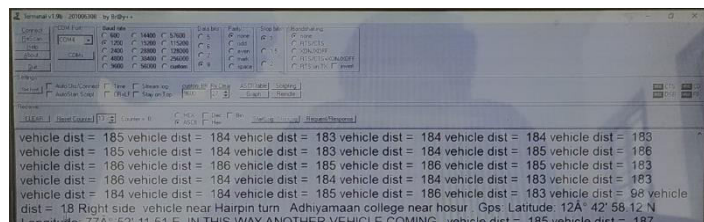
VI. WORKING PRINCIPLE

The project has been designed to prevent an accident by collision. This project proposes an idea to reduce the accidents and provide safety measuring techniques in hairpin curves using sensors, which detects the obstacles within meters range of the vehicle using ultrasonic sensors. If a vehicle is at meters from the curve, then the sensor will automatically sense the vehicle and gives the signal to the driver coming in the opposite vehicles with a li-fi device. Here we using Ultrasonic & IR sensors, which are placed on the roadside of the hairpin bend. The ultrasonic sensor is used to measure the vehicle distance and the IR sensor is used to detect the nearest vehicle to our vehicle. Our sensors and li-fi transmitter are installed by the side of the uphill section of the road, similarly, the vehicle side li-fi receiver is installed and place inside the vehicle to monitor the opposite vehicle easily using a li-fi receiver.

VII. RESULT AND DISCUSSION



BEFORE VEHICLE DETECTION



AFTER VEHICLE DETECTION



VIII. LITERATURE SURVEY

1.R. S. Rakul has proposed “Implementation of Vehicle Mishap Averting System Using Arduino Microcontroller”.

The Unit has been designed to forestall an accident with the aid of collision. The ‘heart’ of the Unit is the Arduino microcontroller which performs all the necessary duties of the system. And it will be mentioned in the following subsequent sections. This machine will acquire data from the Ultrasonic transceiver, and accordingly, transmit the information by the Wi-Fi router to the controller. Through the buzzer indication, light-emitting display, and liquid crystal display, the automobile records will be proven to the car users. The principal reason for the machine is to stop collision between two or greater cars when they take a flip on U-bends.

2. Lorate Shiny¹, A. Rajakumaran², S. Vijay are proposed “Vehicle Control System with Accident Prevention through Using IR Transceiver”

Drivers go at a very excessive pace typically close to the college zone or indulge in dashing inflicting inconvenience to the different car customers and pedestrians. Even although these are supposed for the protection of the cars journeying and for the generic public, it is now not typically practiced and disregarded by the car drivers. The fundamental goal of this paper is to diagram a Vehicle controller intended for automobile pace manipulate and monitors the zones, which can run on an embedded system. Vehicle Controller can be customized designed to suit a car dashboard and shows records on the vehicle.

3.P. Arvind, V. Kishore are proposed “E-Vehicle- Automatic Speed Control Using Android Mobile Application”:

In the hastily changing world, velocity has to turn out to be an essential aspect of humans’ life. Everyone wishes to get speedy as a great deal as possible. In the quick paced world, there are two perspectives, one is retaining the velocity and the difference is keeping the safety medium as well. In the clever pace world, technologies play a main role. Smartphones are a key phase of the developing technologies around the globe. Android software is ruling almost 75% of the crowd. So, our goal is to make sure most security to the character who is using the car and to the people on the street in all parameters via a cell app.

4. K. P. Sreevishakh et al have proposed an automated accident prediction and the notification system with the use of AMR and Sonar sensors.

The Unit has been designed to prevent an accident by using a collision. The ‘heart’ of the Unit is the Arduino microcontroller which performs all the necessary duties of the system. And it will be discussed in the following subsequent sections. This device will obtain data from the Ultrasonic transceiver, and accordingly, transmit the information using the Wi-Fi router to the controller

5.T. H. M. A. Y. K. K. Isamu Takai, “Optical Vehicle-to-Vehicle Communication System Using LED Transmitter and Camera Receiver,”.

The pinnacle view of the front car and returned automobile is presented. The top view gives the various sensors interfaced with the management unit. The Top view of the front car consists of a buzzer and an LCD reveal to notify the driver with a warning message. The Photodetector is used in the front car to acquire the information transmitted with the aid of the LED.

IX. CONCLUSION

The transmission of records from the roadside to the car facet is performed in a very less difficult via Li-Fi technology by the using the led light. Thus, this approach will assist us to keep away from street accidents. In the future, the transmission of this record transmission using Li-Fi technological know-how will be promised to play an imperative position in human’s life. Here in this report, we are going to sort out the hassle like speed and jamming in WI-FI by means of using LI-FI technology. With the Li-Fi, Ultrasonic Sensor, R2V communication, and Infrared Sensor technologies, we have validated an Enhanced Collision Avoidance System (ECAS), which radically improves the interplay capability between the clever vehicle and the exterior environment, and reduces the likelihood of a collision.



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BIOGRAPHY



Mrs. R. Anjana Devi,
Assistant Professor,
Engineering Department,
Adhiyamaan College of Engineering,
Anna University.



Karthikeyan V,
Bachelor Of Engineering,
Adhiyamaan College of Engineering,
Anna University.



Kabilan V,
Bachelor Of Engineering,
Adhiyamaan College of Engineering,
Anna University.



Dhinesh N,
Bachelor Of Engineering,
Adhiyamaan College of Engineering,
Anna University.



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