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AUTOMATIVE SENSORS IR AND LED TECHNOLOGY FOR VEHICLE ON ROAD GUIDANCE

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Abstract: Night travelling leads to lack of travelling judgment and dangerous for beginner drivers. Even the expert driver may miss the wheel judgment in 4-wheelers due to less visibility in front view lower position. On other hand GPS map, guided driving may distract the driving attention and lead to abnormal situations. The proposed system will be design to guide driver using infrared beam design to about wheel judgment and the vehicle passing lane space judgment. This technology could also extend to display mapping information and all other information that may guide driver on road. The number of vehicles on our roads is burgeoning day by day. This is turn forced almost all this vehicle manufactures to think about the extra safety instruments and electronic controls to attach with these products for giving the users a safety derived in all road conditions through a mass flow traffic. Currently central locking system and theft detection system is available in the vehicle these can alert car owner for theft detection but major problem with all these system is it can alert local users only not to the remote one.

Keywords: Microcontroller, Arduino Board, Embedded System,IR LED,UV LED, Buzers,Light sources

1. INTRODUCTION

The number of vehicles on our roads is burgeoning day by day. For this reason almost all the vehicle manufactures have to think about the extra safety instruments and electronic controls to attach with these products for giving the users a safety. Modern automotive vehicles include a variety of different lamps to provide illumination under different operating conditions. Headlamps are typically controlled to alternately generate low beams and high beams. Low beams provide less illumination and are used at night to illuminate the forward path when other vehicles are present. High beams provide significantly more light and are used to illuminate the vehicle's forward path when other vehicles are not present. Daylight running lights have also begun to experience widespread acceptance. High beam are used for illuminating a road doesn't have very much traffic on it. By that way the driver can see further ahead for any road obstructions. High beam is also used when a driver is one an unfamiliar road and if there isn't much in the way of lighting such as street lamps. Automatic high beam, as explained is opposite beam detector. Another probable application of automatic high beam is our high beam response due to another high beam and automatically our high beam becoming low.

Our work proposes an effective automatic control of the vehicle headlamps based on the detection of head lights and tail lights under night time road conditions. This project is about to control high/low beam automatically. This project will make sure that the consumer will save their time and energy also for those who have the illness of nervous. This project will not disturbing any manual function of the beam.

There is a wide range of sensor technologies available for vehicle detectors. Some of the most common and some developing technologies are described in this section.

An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and or the detecting infrared radiation. Infrared sensors are also measure or observe the heat of an object as well as by detects the motion .an infrared sensor circuit is one of the basic and popular sensor module in an electronics device. This sensor is analogous to human's visionary senses which can be used to detect obstacles and these type of sensors measures only infrared radiation, rather than emitting that is called as a passive IR sensor .usually in the infrared spectrum .all the objects radiation some form of thermal radiations are invisible tour eyes, that can be detected by an infrared sensors. The emitter is simply an IR LED (light emitting diode) and the detectors is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED.

The Federal Automated Vehicles Policy [2] document

released by NHTSA in September 2016 states that 35,092 people died on US roadways in 2015 and 94% of the crashes were attributed to human error. Highly automated vehicles (HAVs) have the potential to mitigate most of these crashes. They also have such advantages as not being emotional, not fatiguing like humans, learning from past mistakes of their own and other HAVs, being able to use complementary technologies like Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) – which could further enhance system performance.

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On other hand GPS map, guided driving may distract the driving attention and lead to abnormal situations. The proposed system will be design to guide driver using infrared beam design to about wheel judgment and the vehicle passing lane space judgment. This technology could also extend to display mapping information and all other information that may guide driver on road.

On average, at least one person globally dies in a vehicle crash every minute. Auto accidents also injure at least ten million people each year, with two or three million of these people seriously injured [1]. To address this problem, Advanced Driver Assistant Systems (ADAS) are used more and more often to provide assistance and supplementary information for drivers. Current ADAS developments include many functions such as lane departure warning, forward collision warning, parking assistance systems, and night vision enhancement [2].

The vision sensor is one of the most popular sensors in ADAS and many algorithms are designed to use it including vehicle detection, lane detection, pedestrian detection, and traffic sign recognition [3–6]. Among these methods, vehicle detection is a popular research area. Monocular vision is often used in this task. The Sivaraman model considers vehicle detection as a two-class classification problem and trains an Adaboost classifier with a Haar feature.

The current reality is that a large number of road accidents occur during times of low visibility such as at night time. Statistical data also demonstrates that more than half of accidents causing fatalities occur at night. However, most existing vehicle detection systems and algorithms are more focused on daylight vehicle detection with visible spectrum cameras.

Three different mode are used,

1.1 **Auto Headlight:**

In developing and developed nations the Governments are giving higher priority for the road infrastructures. They consider the road infrastructure will boost their economy in many ways and it is a true fact too. The automobile industry also improved their vehicles in many aspects, mainly speed of the vehicles. The accidents on roads are having very high adverse effects compared to olden days due to modern vehicles with the provision of high speed. Many studies throughout the world have proved that the accident percentage is high during night time compared to the day time. It is not less common that accidents are high at day time as well especially during bad weather like rainy day, foggy morning or evening and snowy time. There are many factors playing major role during these accidents, but the top most reason for these accidents are poor visibility of the drivers.

1.2 **Busser Alert:**

Door and window sensor alarms are actually the same device. The basic functioning is a contact sensor that triggers an alarm when a door or a window is opened without authorization. This type of alarms represents the ultimate perimetral defense for your facility and it is widely used in companies and residential buildings

Door sensors serve to create safe homes and offices by warning against intrusion at access points that get opened often. They can work equally well with doors, windows, and cabinets.

A door-held-open alarm with a pleasant chime can warn a receptionist that a visitor has just entered the building, leaving enough room for attending other duties. When an intruder tries to forcefully break through an office door that he or she is not authorized to use, the monitoring system will let the controller know. Door-left-open alarms enable setting longer delivery times for goods and reducing them when the delivery is complete. They guard against one of the most common security intrusion events - piggybacking or tailgating.

The buzzer consists of an outside case with two pins to attach it to power and ground. When current is applied to the buzzer it causes the ceramic disk to contract or expand. Changing the This then causes the surrounding disc to vibrate.

1.3 **LED Indication:**

One of the major challenges that autonomous cars are facing today is driving in urban environments. To make it a reality, autonomous vehicles require the ability to communicate with other road users and understand their intentions. Such interactions are essential between vehicles and pedestrians, the most vulnerable road users. Understanding pedestrian behavior, however, is not intuitive and depends on various factors, such as demographics of the pedestrians, traffic dynamics, environmental conditions, and so on. In this paper, we identify these factors by surveying pedestrian behavior studies, both the classical works on pedestrian-driver interaction and the modern ones that involve autonomous vehicles. To this end, we will discuss various methods of studying pedestrian behavior and analyze how the factors identified in the literature are interrelated. We will also review the practical applications aimed at solving the interaction problem, including design approaches for autonomous vehicles that communicate with pedestrians and visual perception and reasoning algorithms tailored to understanding pedestrian intention. Based on our findings, we will discuss the open problems and propose future research directions.

LEDs are available in five different ‘brightness’ categories, which are usually known as Standard, High Brightness, Super Bright, Ultra bright, and Hyper bright.

Image Sample front guidance IR LED projected lights

2. LITERATURE REVIEW

2.1 REPORT ON VEHICLE OVER SPEED DETECTION AND RECOGNITION

Road accidents have been very common in the present world with the prime cause being the careless driving. The necessity to check this has been very essential and different methods have been used so far. so However with the advancement in the technology, different governing bodies are demanding me sort of computerized technology to control this problem of over speed driving. At this scenario, we are proposing a system to detect the vehicle which are being driven above the given maximum speed limit that the respective roads or highway limits.
The output was more accurate with no other moving objects in the surrounding. The value of speed of each passing vehicle was displayed in the LCD display

2.2 Vision Based Road Lane Detection System for Vehicles Guidance

Driver support system is one of the most important feature of the modern vehicles to ensure driver safety and decrease vehicle accident on roads. Apparently, the road lane detection or road boundaries detection is the complex and most challenging tasks. It is includes the localization of the road and the determination of the relative position between vehicle and road. A vision system using on-board camera looking outwards from the windshield is presented in this paper. The system acquires the front view using a camera mounted on the vehicle and detects the lanes by applying few processes.
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2.3 Automatic High Beam Controller for Vehicles

The number of vehicles on our roads is burgeoning day by day. This is turn forced almost all this vehicle manufactures to think about the extra safety instruments and electronic controls to attach with these products for giving the users a safety derived in all road conditions through a mass flow traffic. If asked, one should always mention that the right driving is very cumbersome due to the dazzling light problems and the frequent dipping of headlights by manual means that often causes fatigue to the driver particularly at the time of peak traffic. So naturally to get rid of this perennial problem, an automatic mechanism has to come up to dip the headlamp automatically whenever required. For keeping a motor vehicle under perfect control and reins of the driver, different types of controls and accessories are provided in an automobile around the driver's seat, on the dashboard and at the footboard.
Simply, an automatic high beam controller is a unit, which can automatically judge when the headlight beam needs to be lowered, and which dip the headlamp from which beam to a dipped beam. Our work proposes an effective automatic control of the vehicle headlamps based on the detection of head lights and tail lights under night time road conditions. This project is about to control high beam or low beam automatically.

Report on Road Guidance safety on vehicle
IR sensor works on by using a select- light sensors to detect a selected light wavelength in the infra-red (IR) spectrum. At present we are surrounding by electronics and communication devices such as infrared sensor use in many applications. Infra-red sensor just get any of the mobile with infrared sensor blaster feature use in all electronics devices and these device connected with just one device i.e. your phone. In this paper an infrared radiation from a simple paper made device which increase its conductivity when exposed to hot object. The new and improved sensors, algorithms, and products for nighttime lights, in association with other Earth observations and ancillary data (e.g., geo-located big data), together offer great potential for a deep understanding of human activities and related environmental consequences in a changing world. This paper reviews the advances of nighttime light sensors and products and examines the contributions of nighttime light remote sensing to perceiving the changing world from two aspects (i.e., human activities and environmental changes)

2.4 Infrared Sensors for Autonomous Vehicles

The spurt in interest and development of Autonomous vehicles is a continuing boost to the growth of electronic devices in the automotive industry. The sensing, processing, activation, feedback and control functions done by the human brain have to be replaced with electronics. The task is proving to be exhilarating and daunting at the same time. The environment sensors – RADAR (Radio Detection and Ranging), Camera and LIDAR (Light Detection and Ranging) are enjoying a lot attention with the need for increasingly greater range and resolution being demanded by the "eyes" and faster computation by the "brain". Even though all three and more sensors (Ultrasonic / Stereo Camera / GPS / etc.) will be used together; this chapter will focus on challenges facing Camera and LIDAR. Anywhere from 2 – 8 cameras and 1 – 2 LIDAR are expected to be part of the sensor suite needed by Autonomous vehicles – which have to function equally well in day and night. Near infrared (800 – 1000nm) devices are currently emitters of choice in these sensors. Higher range, resolution and Field of view pose many challenges to overcome with new electronic device innovations before we realize the safety and other benefits of autonomous vehicles.

On the other hand we have the consumer industry from Silicon Valley eyeing autonomous vehicles as a huge platform to engage, interact, customize and monetize the user experience. Think online shopping, watching a movie, doing your email or office work, video chats, customized advertisements based on user profile and location, etc. – all while our transport takes us to our destination. The innovation and business potential presented by the HAVs is only limited by imagination and savvy to overcome the challenges
Image sample display about the warning message projection

3. STUDY OF EXISTING SYSTEM

Paper/Article & Author	Content	Differences
The Vehicle Over Speed Detection And Recognition, Prashnna K.Gyawali, Robin Chatatut,S Shailesh Acharya	we are proposing a system to detect the vehicle which are being driven above the given maximum speed limit that the respective roads or highway limits.	Provides an idea to achieve and improve security and preventive measures in the events of thefts and accidents. IOT while still in its infant stage has tremendous potential to automate a variety of functions
Automatic High Beam Controller for Vehicles, Shuva Paul, A.S.M Asaduzzaman, Mohammad Mahmudul Islam	High beams provide significantly more light and are use to illuminate the vehicle's forward path when other vehicles are not present.	The device will switch the high beam of those vehicles to low beam whenever it will get another vehicle coming towards with high beam.
Intelligent Headlight System mal, Abhay N. Shinde, Abhijeet R. Tad, Akshay A. Andhale	The headlights can be connected to the steering linkage by means of rods or cables, operated hydraulically by the power steering or now a days electronically adjusted, even controlled by satellite navigation system conditions	Carrying out test with the project vehicle has proved that this concept works and although such lights are not widely used even nowadays, it does support the driver's vision during night-time driving
Automatic Vehicle Accident Detection and Messaging System Using GSM and GPS Modem. SRI KRISHNA CHAITANYA VARMA, POORNESH, TARUN	The aim of our work is to find the vehicle accident location and sending a message using GPS and GSM .	The sensor is activated we will be immediately getting the accident spot accurately from GPS modem and sending the message through GSM.

Table 3.1.0: Comparison Table

4. CONCLUSION

A real time vision-based lane detection method was proposed. Image segmentation and remove the shadow of the road were processed. Canny operator was used to detect edges that represent road lanes or road boundaries. A hyperbola-pair road model used to deal with the occlusion and imperfect road condition. A series of experiment showed that the lanes were detected using Hough transformation with restricted search area and the projection of their intersection will form the last scan point called the horizon. Furthermore, In order to search out for the left and right vector points that represent the road lanes, the lane scan boundary phase uses the edge image and the left and right.

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