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Autonomous Driving And Sensing Applications

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Abstract:

In present condition, more road accident occurs in the night time. In most of the cases, late identification of upcoming objects becomes the main cause of the accident. This condition gives the forward headlight systems a key role in automobiles. To reduce road accident, we have developed the visibility objects coming from front side of the vehicle. Due to this, need have to improve headlight system. To reduce late night accident makes automatic controllable headlight system. The main parts of automatic driving and sensing system are checked. After checking many types of headlight. After the getting good and accurate result ,controllable headlight system is created. Importance of headlight system is very much in night time. While driving there may be an irritating situation due to the headlight lamp focus from the opposite vehicle. Autonomous Driving and Sensing System (ADSS) gives solution to this problem. Brightness of headlights is controlled.

Keywords: *Autonomous Driving And Sensing System (ADSS)*

1. Introduction

Due to the need of vehicle increase in day to today life .The number of vehicle on the road in day as well as night is increase due to high requirement of society. If the vehicles are increases and chances of accidents occur are also increases. The higher authorities carried out number of action plan for this now. But ratio and effect are very less. If we observe number of count in day time and night time. The count is more in late night. The reason behind this may be low vision and ignorance of the oncoming traffic headlight. For some time it creates blur or blindness. So there is need that incoming signal should converted to low level but it gives rise to blindness of person. So in our implemented system we take help of camera. The camera resolves problem of incoming signals. In this system, camera detects the incoming signal and helps drive automatically to control headlight. The automatic Driving and Sensing System is helping the driver for change between the more intense beam and less intense beam .Hence headlights are used to improve visibility. There are two modes used while the headlight is operational- low beam mode

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and high beam mode. Low beam as the name indicates uses less intensity for small region of visibility in front of the vehicle as compared to high beam which utilizes high intensity. All the commercial vehicles use manual change for low and high beam. For these types of vehicles the problem arises. When incoming light is in high intensity. To solve this problem, an automatic headlight switching system is proposed which switches between high beam and low beam with the help of a raspberry pi processor. The system utilizes a camera fitted inside the car. The camera eye is covers full view of the front. It also decides for changing the switch from low to high.

2. Literature Survey

The system adopts CAN/LIN bus for communication. It captures automobile steering wheel angle and automobile body's tilt angle. It focuses on two things external light luminance and switching signal. Then it sends to the corresponding nodes to control headlights after being processed. The automobile turns, the system can control the headlights left-right leds. The automobile is upwards or downward, the system can control the headlights pitch servo. The automobile get in and out of the special path such as tunnel, culvert. The system can control headlights for tuning-on and off during the day. [1] This system tries to control the beam angle using LED's based on Steering Wheel rotation. A relay circuit that uses switches the LED bulbs glow from 10, 20 and 30 deg. LED bulbs are is used due to their low power consumption. This system is easily implemented. [2]. It is providing safe angle control in difficult situations by the steering angle. If the symmetric angles is broken in the unknown interruption. So they are saved in active angles.[3] This paper introduces on the design and working of a microcontroller based Adaptive Headlight System (AHS) for automobiles. The main purpose of this system is to present a cost effective technique to illuminate blind spots while driving in the night. During these times the visibility is reduced. So it will make the objects visible in those darkened locations and prevent accidents. [4]In this paper, system has two types Master and Slave are implemented. They are communicating through Controller Area Network (CAN) protocol. The Master module has gas leakage detection. It also gives protection and temperature controlling sensors. The Slave module has Automatic Front Headlight Adjustment system (AFHAS).It also have short circuit fault line indicator. The hardware has been created and developed using SMT (Surface Mount Technology) with SMD (Surface Mount Device) components and the hardware uses double layer PCB (Printed Circuit Board. [5]Here steering of the vehicle is considered as a potentiometer or an accelerometer, the servo motors along with LEDs are rotated accordingly to the steering angle produced from the data provided by potentiometer or accelerometer so as allowing light to spread over the entire road.[6]

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3. Implementation of the System

The system will use Raspberry Pi controller and a pi camera. The camera will capture the image, it will do image processing and detect the vehicle.If vehicle is detected then it will turn off the leds. If the vehicle is be at the left side, then the left side leds will get turned off and if vehicle is at right side the right side leds will get turned off. In this way the implemented system will work. The image processing will be take place as shown in fig 1 below. The vehicle detection steps using PYTHON is shown below in figure 1.

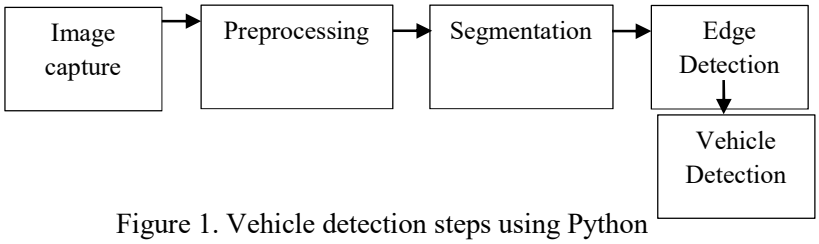

Figure 1. Vehicle detection steps using Python

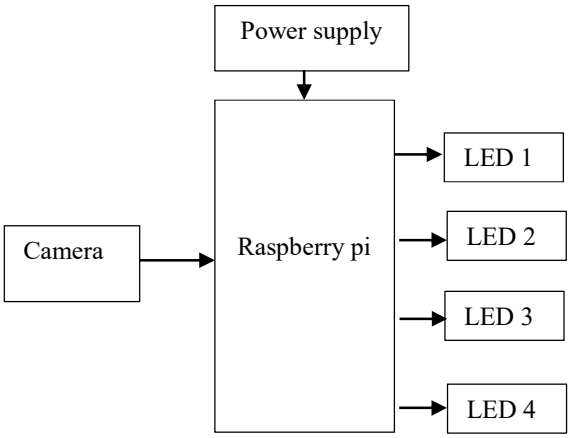

Figure 2.Block diagram Autonomous driving and sensing system

The methodology adopted is illustrated-

Camera will capture the image; it will undergo preprocessing, segmentation, and edge detection. After edge detection vehicle will be detected. If vehicle is detected the leds will get off. If right side vehicle is detected right side led will get on and if left side vehicle is detected left side led will get on.

Canny Edge Detection

- Image acquisition.

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The image acquisition is carried out with the web camera. First image of the road is captured, when there is no traffic on the road. This image is saved

- RGB to Gray Conversion

RGB to gray conversion is carried out. It gives progression of captured t. After that gamma correction is done. So gray image is gives achieve image enhancement.

- Image Enhancement

The acquired image in RGB is turns into gray. After that we want to bring our image in contrast to background. The suitable threshold level may be selected. While binary conversion is carried out. This gives for image enhancement. The objective of enhancement is to process an image so that result is more suitable than the original image for the specific application.

- Image Matching Using Edge Detection

Edge detection methods locate the pixels in the image .It gives rise to the edges.

- Edge Detection

Edge detection is a basic tool in image processing, machine vision and computer envisage, particularly in the areas of feature reveal and feature extraction.

As shown in figure 2, it shows web camera and Raspberry Pi also leds.

Steps-

a) Images are rescaled to fixed resolution.

b) Then the above rescaled images are converted from RGB to gray.

c) Edge detection of pre-processed images is carried out using Canny edge detection technique.

d) The output images of previous step are matched .The matching is done with the help of pixel to pixel matching technique.

e) Vehicle Detected.

1. Results and Discussions

The system uses Raspberry Pi controller and a pi camera. As shown in figure 3-a python code for implementation of the system and capture of the image using camera. Then divide the image into two parts left and right as shown in figure no.3-b.If vehicle is detected then it will turn off the leds. If the vehicle is be at the left side, then the left side led gets turned off and if vehicle is at right side the right side led gets turned off as shown in figure no.3-c.

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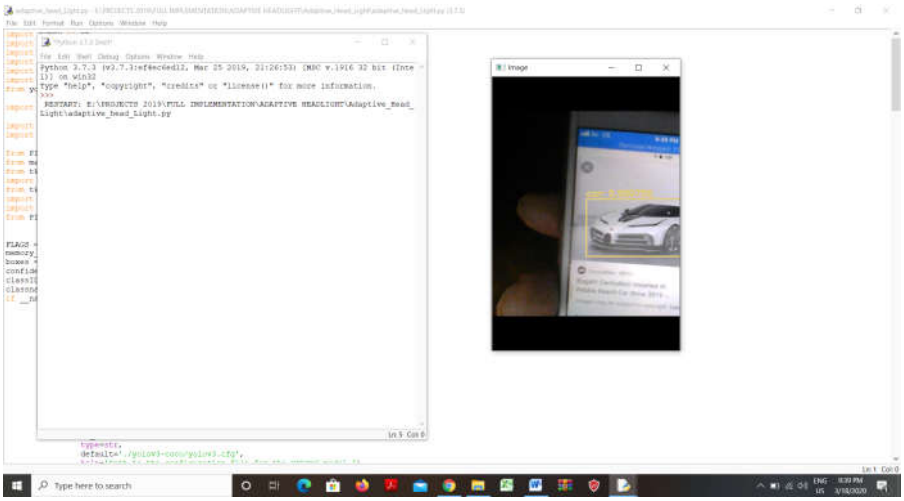

(a) First Part of the captured image (b) Second Part of captured image

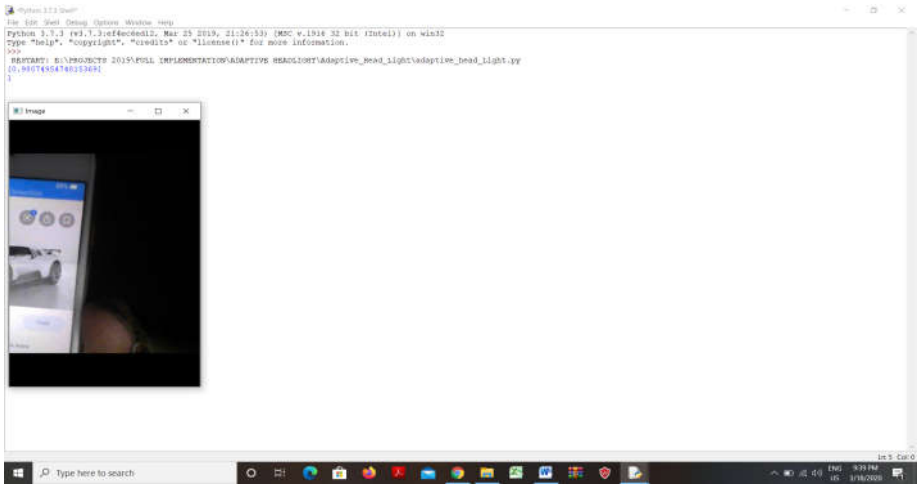

Figure no.3: Capture Image and Divide in two parts

(c) Turn ON or OFF LED

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5. **Conclusion**

Thus we are implemented a system which will automatically adapt the headlight in the night. The driver does not face low beam and high beam problem in the night. The system is minimizing the accident rate upto the mark.

References

[1] Design and Implementation of the Adaptive Control System for Automotive Headlights Based on CAN/LIN Network, International Conference on Instrumentation, Measurement, Computer, Communication and Control, No.3,pp-1598-1602, 2013.
[2] An algorithm for headlights region detection in nighttime vehicles, International Conference on Information and Automation Ningbo, China, pp-1578-1582, August 2016.
[3] Improving light spot tracking for an automatic headlight control algorithm,16th International IEEE Annual Conference on Intelligent Transportation Systems, Hague Netherlands, pp-1089-1094,October 6-9, 2013
[4] Nighttime Vehicle Detection for Driver Assistance and Autonomous Vehicles, 18th International Conference on Pattern Recognition, 2006.
[5] Universal adaptive headlight system, IEEE International Conference on Vehicular Electronics and Safety, Hyderabad, India, pp-7-10, December 16-17, 2014.

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