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# AUTOMATIC LIGHT SPOT HEADLIGHT TRACKING

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## ABSTRACT

*From recent lustrums the graph plot of the road accidents is been increasing drastically. Here we propose an effective and efficient system to mark down the number of road accidents occurring at night by continuous vehicle detection through a camera assisted vehicle from the opposite direction to automatically switch the camera assisted vehicle's headlights from high beam to low beam and inversely therefore diminishing glares for the vehicle drivers. The working mechanism states that the vehicles headlight positioning will switch to low beam when automotive light is detected and switch back to high beam when it is cleared. The application of image processing techniques is analyzing the sources of light and detection of vehicles continuously.*

***Keywords—****Camera assisted vehicle, High Beam, Low Beam, Automotive light, Image Processing.*

## I. INTRODUCTION

During night times the headlight requirement becomes very necessary in order to prevent vehicles from crashing into each other. The headlight that helps the driver by providing better vision while travelling during the dark hours can at the same time be responsible for many brutal accidents [1]. This issue is becoming one of the major concerns for the automobile manufacturers, henceforth they have to come up with more secure and safe measures. Most of the vehicle drivers encounter discomfortness due to the over bright beam heading from the vehicles coming from the opposite direction that causes a instant glare in the driver's eye that blinds them for a short duration of time [1]. This can serve as a cause for many grievous incidents. To avoid this issue the driver has to accordingly adjust the headlight between high and low beams. During night hours when there are no light sources available we usually prefer high beam else low beam. The amount of illumination provided by headlights low beam is less as compared to the headlights high beam.

The accidents count increases in the world every year but as the measure taken by the automobile industries in developing new technologies as resulted in the decrease of fatalities. The major measure that should be taken to avoid such fatalities is by preventing the smashing of vehicle into one another. The system that has been proposed scale downs this problem by automatically switches from high beam of the headlight of our vehicle to low beam when a vehicle is sensed as a closed proximity coming from the opposite direction [5].

## II. RELATED WORK

[1]Design & implementation of Automatic Headlight Dimmer using LDR (Okrah S.K) this system uses LDR for light detection. Signal transmission in the system is done using Zigbee module. In urban areas this system becomes inefficient. The usage of Zigbee module in the system is not essential. Only the vehicles at close range are detected by the system.

[2]Automatic LightBeam Controller For Driver Assistance (P.F.Alcantarilla) aims the headlights high beams usage to the maximum level possible without disturbing the forth coming traffic. The system proposed is uneconomical as it is overpriced and maintenance cost is high.

[3]GENTEX: Vehicle Lamp Control System for automatically controlling vehicle headlamps to control the headlight. At any driving condition the maximal amount of light is provided by optimizing the usage of headlamps in the vehicle. The system is not cost effective.

## III. PROPOSED SYSTEM

The frequency of road accidents is increasing drastically over the recent decades especially during the night time. The major reason being the lack of visibility during night time as compared to day time and the over bright headlight beam of about 1000 lumens will produce an instant glare that blinds the driver's eye for certain instance of time, known as Troxler effect or Fading effect (*Troxler Effect is a phenomenon in which a person reveals a blind spot due to some high intensity light directly focused at his retina*). This effect occurs when human's retina is filled with bright light which in turn causes illusion that increases a person's reaction time by1.4-.19 seconds. This effect takes place due to the rods and cones being over exposed to the light. Troxler effect is experienced when the driver's eye encounters a high beam headlight coming from the opposite direction as manual switching of headlights from high to low beam again and again can get very tedious and annoying.

### **3.1** System design and implementation

In this paper a new method is proposed in which the tracking mechanism can be achieved in less cost [3]. The components which are used in this system are easily available. All the components are selected with utmost care and are accurate. The system is drawn simple, and is made more efficient by thresholding the processing range of the camera. This becomes important due to the unwanted reflections that can manipulate the system to switch from high beam to low beam and back forth. This system smartly processes the signals that are in the required range(between 60,61 and 260,261 pixels of each frame) to avoid unnecessary headlight switching from high beam to low beam and vice versa caused due to the unwanted reflections and noise.

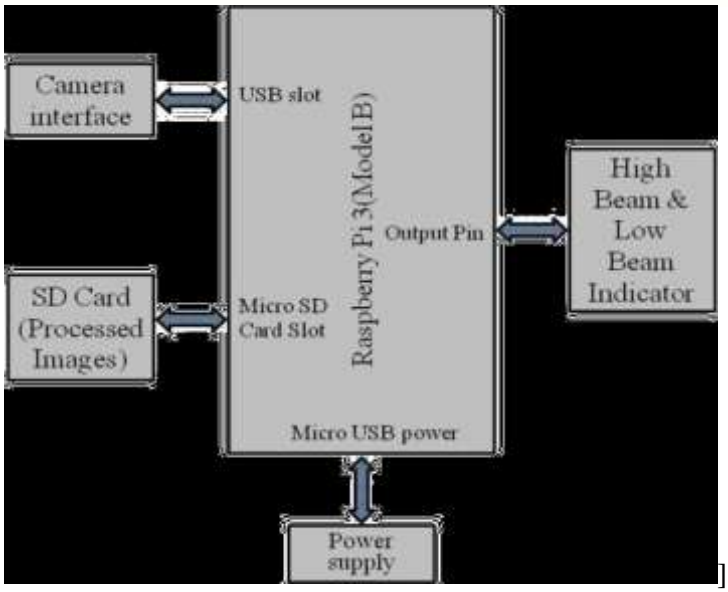


Fig.1. Block Diagram of the system

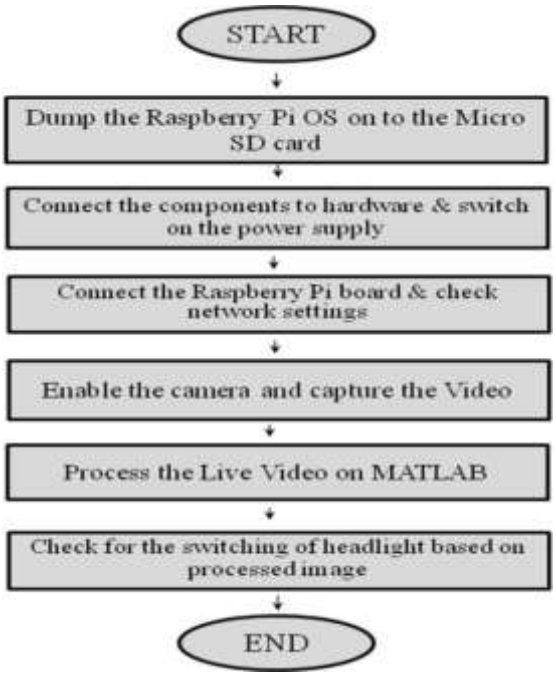


Fig.2. Flow diagram of software setup

3.2. Image thresholding

The algorithm that has been used in this system is thresholding.

Step 1: The original image is being read.

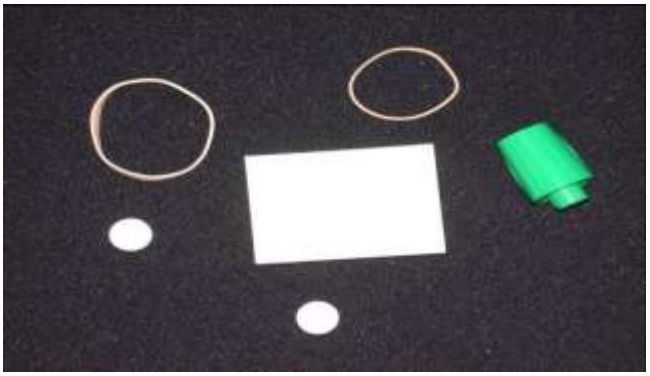

Fig.3. Original image

Step 2: The coloured image is being converted into gray scale image.

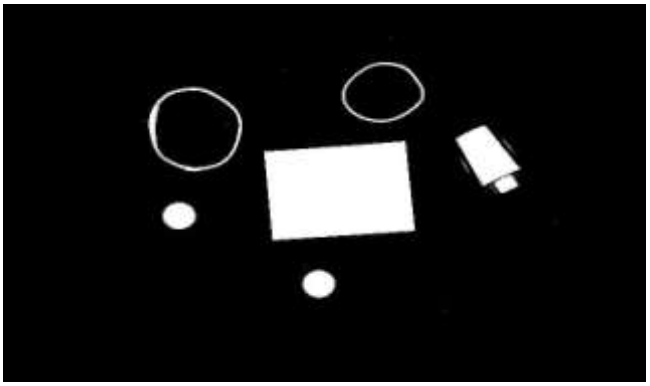

Fig.4. Image thresholding

Step 3: Unwanted noise is removed in order to get the clear image.

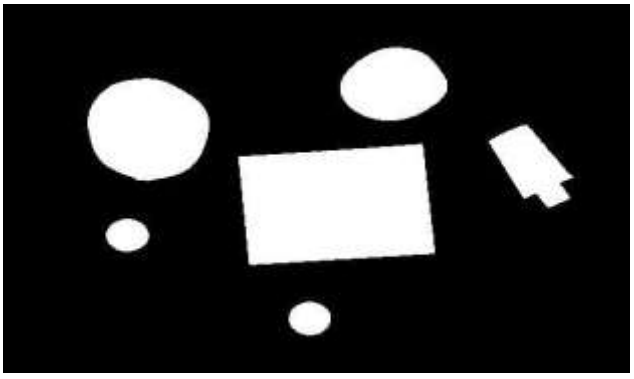

Fig.5. Noise removed

Step 4: Enhancing the above image in order to find the exact boundaries.

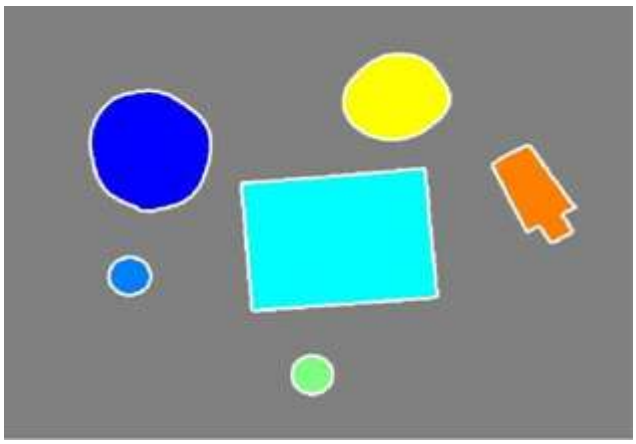

Fig.6. Placed Boundaries

Step 5: The objects are determined and the boundary boxes are placed

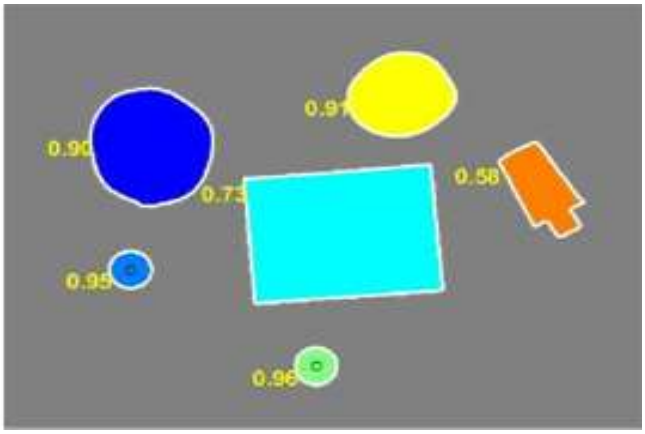


Fig.7. Bounding box placed

## IV. DISCUSSION

In image processing field thresholding is one of the effectual algorithms. After the image detection the image is converted into grey scale image and further processing happens. The threshold is set for the image (here 255), processed as mentioned in the above algorithm and the final decision is made whether to switch the headlight from high beam to low beam and vice versa. Fig 8 describes the real time image where a car with the headlight is captured. Fig 9 shows the actual image converted into black and white image. Fig 10 shows the assignment of bounding box. Using a Logitech camera the headlights between the range (0 to 60 pixels from bottom and 40 pixels from the top of the frame) are

not detected so as to increase the processing speed. Vehicles falling within the range are detected and processed.

**Fig.8**. Original image

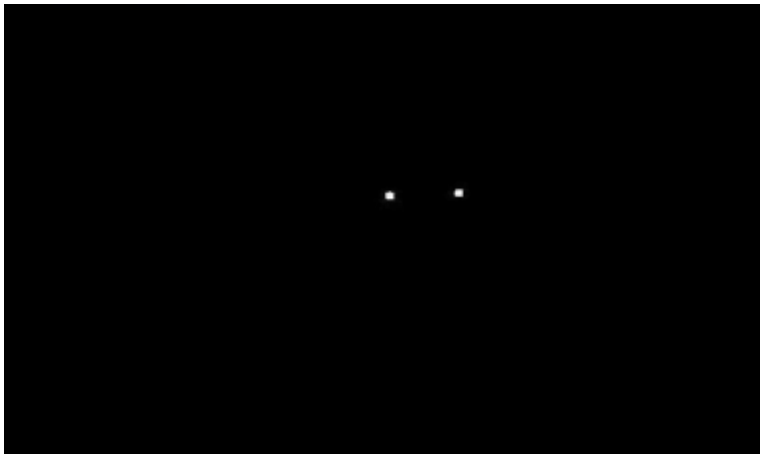

**Fig.9**. Thresholded image

**Fig.10.** Bounding box placed

## V. CONCLUSION AND FUTURE SCOPE

The number of road accidents is increasing rapidly day by day. The driving rules and regulation are not followed my most of the drivers in our country. These drivers are unaware that bright headlights beam can be the reason for deadly road accidents. Every day many people risk their lives in road accidents. This problem should be taken into consideration by the government of our country.

So the purpose of this paper is to introduce this system in each and every vehicle. Whenever there is a vehicle coming from opposite direction with high beam, this device will automatically switch high beam to low beam. This device will work through IR technology if there is no light. Finally, by implementing this device the chances of road accidents may decrease. The system which is used is less expensive and can be executed automatically. This designed device "Headlight Switch Control" will be beneficial in reducing road accidents especially high way road accidents.

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