

Adaptive Head Light System Using Image Processing

¹Medha B. Patil,²Prof. S.V. Phakade

¹ M.Tech student , ² Associate Professor

^{1,2} Deptt. of Electronics and Tele-Communication Engg., ^{1,2} P.V.P.I.T., Budhgoan, Sangli, India

Abstract: The highest traffic accident occurs on curved road at night time. The exiting conventional light do not provide properly illumination at curved road. Due to this drawback we need to understand the alternative solution. The main aim is to improve the visibility for driver and to increase safety and comfortless for driver. Adaptive front light system is improves the driver visibility at night-time with comfortless and safety. This system used to detect information about corner and incoming objects. In this system headlights moving according to steering angle. This is a review paper on Adaptive head light system using image processing.

Keywords : Adaptive head light system, headlights.

I. INTRODUCTION

In day, todays life we can observe that there are more number of vehicles getting added. Fortunately or unfortunately some accidents takes place. As per the survey more number of accidents takes place during the night. This caused us to design a vehicle with adaptive headlight system. As per its name the headlight will be automatic and illuminate the light in the correct region and direction when vehicle takes turn from narrow corner. By this adaptive system we can minimize the accidents taking place due to the light. This system not only help during vehicle taking turns at curves but also when another vehicle coming in opposite direction with brighter lights. The adaptive system will adjust the brightness of the light depending on the distance of vehicle approaching the another vehicle.

As shown below figure 1 car A uses the non-adaptive head light system and car B uses adaptive head light system. The diagram illustrates that the when car A is taking a turn then the light is more illuminated on the corners than on the road which may lead to accidents. While car B uses the adaptive light system which will get more focus on roads than on the corner which in return result in more clear visibility to driver.

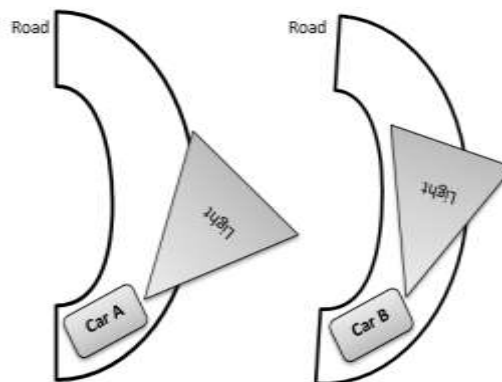


Figure 1

II. LITERATURE REVIEW

DubalPriyanka M, Nanaware J.D [1] have presented modeling and simulation on adaptive front light system for vehicles to reduce the number of accidents taking place during night times. According to this paper it has been said that accidents occurs due to no proper illumination of lights at the curves of the roads. Driving the car with conventional headlight system is unsafe because as it does not provide proper light in proper direction for safe drive. So they have proposed new system which is a AFS (Adaptive Frontlight System) which will sense the corner of road with the help of camera and ultrasonic distance sensor and provide illumination of light accordingly. They have used MATLAB for processing he captured image and according to the output the headlight is moved to avoid blind spot and increase drive safety during night time.

Harish Kumae V, Avinash R, Niresh.J, Neelakrishnan.S[2], this paper proposed that the headlight will move according to the movement of steering wheel. The basic idea behind is that the potentiometer is connected to steering axis and gives output signal to the microcontroller. The microcontroller processes the signal and sends to servo motor, which rotates the head light according to the signal received. The horizontal swing of headlight by the angle of steering while the vertical swings headlight by sensing the distance of opposite vehicle. This will return he result as the headlight will move accordingly with the steering angle and will provide better visibility to driver and opposite vehicle.

Robert Tomburoet.al[3] have presented and new system, which provides a automotive headlight which is flexible and can be programmed to perform multiple tasks a high speed. The main idea was to introduce a Spatial Light Modulator (SLM) such as the digital micro-mirror device which is present in DLP projectors. A DMD divides a light beam by approximately one million beams that can be individually controlled. A camera is co-located with the light source and which is processed by computer to generate illumination pattern for SLM. The accuracy is high as the small change in beam positioning and flicker can be easily detected than standard light system. Also the accuracy can be achieved by reducing the time from when the camera senses to when the headlight reacts.

Adhirajkadam, Jubainsharma, Naitik Mehta, Arpanpatel, Prof.HansrajKhande, this paper proposed that the headlight will move according to the movement of steering wheel.In this paper objectives are achieved by designing a model for the horizontal and vertical movement of headlights. For this, he used the sensors like ultrasonic sensor and accelerometer for horizontal and vertical movement of light beam respectively.Arduinouno is used as microcontroller of this system. And stepper motor is used for vertical and horizontal movement of the headlight.

FengqunGuo, Hui Xiao, Shouzhi Tang This paper analysed photometric characteristics of vehicle headlamps when turning according to corner, and developed a new kind of adaptive front-lighting system based on charge-coupled device which was better than traditional AFS. This AFS used CCD image sensor to detect information about the corner and then sent curvature radius to electronic control units in advance. Meanwhile, electronic control units would calculate accurate turning angle of headlamps and send it to motor to adjust headlamps to get the lighting beam which is suitable for the corner. Through this way, when away from the corner it could ignore "blind point" because of the fixed area which is covered by headlights of the vehicle, for improving safety of driving. This paper gave a modelling for horizontal rotation angle of vehicle headlamps, and simulated it with MATLAB.

III. METHODOLOGY AND PROPOSED WORK

According to traffic accident data, the highest traffic accident occurs at curve road during the night time. Night time driving with existing conventional headlamps is particularly unsafe because it does not provide illumination in the right direction on curve roads. At the same time high intensity beam focused directly on line of sight of opposite driver increases chances of accidents. Due to this constrain this system proposes an alternative technology solution to improve visibility for driver at night time during curve road and to reduce glare of the front lights .The proposed system mainly consisting 2 systems which are mentioned below and better than traditional front lighting system.

HARDWARE MODEL

Control Unit is a heart of the system that controls all the peripherals we interface to it. It mainly consists of microcontroller PIC16F877A. This microcontroller easily interfaces with peripherals. Image processing unit is matlab enabled and detects oncoming vehicle. As vehicle gets detected by the system it triggers control unit so that it controls glare of the vehicle. In display Unit, LCD displays are used. This is one of the most sophisticated display devices. It is the easiest and very reliable output device, for micro controller based project, not every time any debugger can be used to simulate the output. So LCD display used to test the outputs.

In most of electronic projects we need a power supply for converting mains AC voltage to a regulated DC voltage or to provide constant DC voltage to circuit if battery operated. For making a power supply designing of each and every component is essential to get exact power through source. This project demands 5v supply to operate. Driver circuit with steering sensor gives changes in the angle of steering as driver rotates handle of a car. Output of steering sensor can give exact digital values of steering angle after processing. Steering rotations can be analysed by the system to turn headlights accordingly.

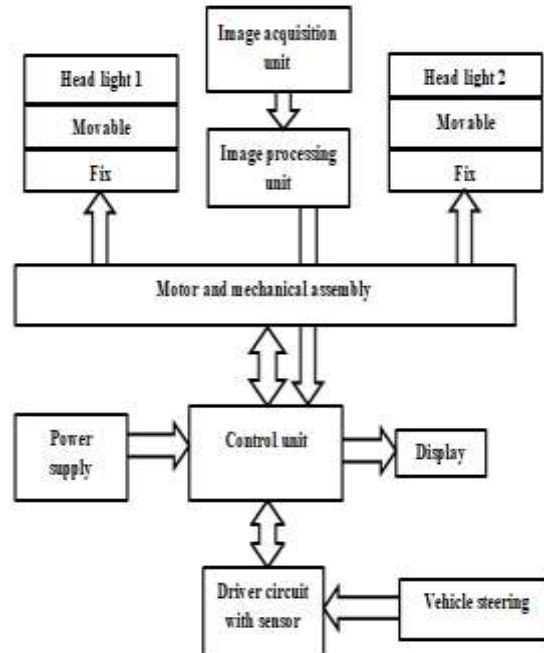


Figure 2. Block diagram of adaptive head light system.

SOFTWARE MODEL

1. MATLAB :

MATLAB Stands for Matrix laboratory. MATLAB is a general purpose programming language. In this project we will use this software for image processing. Image processing is a method of performing some operations on an image, in order to get enhanced image or it extract some useful information from it.

In this project camera is mounted front side of the vehicle. Then this camera capture the images of vehicles on the road continuously with the help of image processing. When any object or vehicle is coming towards the vehicle then matlab detected this object or vehicle and triggered to the system. Based on these information system, it controls the glare of the headlights of the vehicle.

2. MPLAB IDE :

MPLAB is a proprietary freeware integrated development environment for the development of embedded application on PIC microcontroller and is developed by Microchip Technology.

Microchip has a large suite of software and hardware development tools integrated within one software package called MPLAB integrated Development Environment that is IDE.

3. Proteus :

Proteus is proprietary software tool suite used primarily for electronic design automation. This software is mainly use in electronic design engineers. This software containing schematic, simulation as well as PCB designing

CONCLUSION:

This paper present Adaptive Head Light system for vehicles. This system helps to remove “blind spot” and improve the driver’s visibility at night time. Moving the headlights horizontally according to steering movement.

REFERENCES

- [1] Priyanka M Dubal, Dr. Alam N. Shaikh, ”Adaptive Head-Light System for Vehicle”, International Journal of Engineering Research in Computer Science and Engineering, Vol 5, Issu 2, February 2018.
- [2] Snehal G. Magar Dept. of E&TC Engineering JSCOE, Hadapsarpune, India, ”Adaptive Front Light System of Vehicle for Road Safety” 2015 IEEE.
- [3] Shreyas S, Krithanaa Raghuraman, Padmavathy AP, S. Arun Prasad, G. Devaradjane, Madras Institute of Technology, Anna University Chennai, India, ”Adaptive Headlight System for Accident Prevention”, 2014 IEEE.
- [4] Fengqun Guo, HuiXiao, Shouzhi Tang, College of Electronic and Information Engineering, Tongji University, Shanghai 201804, China, ”Research of Modeling and Simulation on Adaptive Front-Lighting system for Corner Based on CCD” 2013 IEEE.
- [5] T. Hacibekir, S. Karaman, E. S. Oztirk, M. Demirci and B. Aksum Guvenc ”Adaptive Headlight System Design Using Hardware-In-Loop Simulation”, 2006 IEEE.
- [6] Dubal Priyanka M, Nanaware J. D, ”Modeling and simulation on Adaptive Front Lighting System for Vehicle Based on Camera”, International Journal of Engineering Research-Online, Vol. 3, Issue. 4, 2015.
- [7] Shinde Ganesh R, Jadhav Tushar D, Varade Shubham A, Korde Goraksha K., Belkar S. B ”Adaptive Headlight System”, International Journal of Informative & Futuristic Research Vol. 2, Issu. 7, March 2015.
- [8] Priyanka Dubal, Nanaware J. D, ”Design of Adaptive Headlight for Automobile”, International Journal on Recent and Innovation Trends in Computing and Communication, Vol. 3, Issu. 3, March 2015.
- [9] Adhiraj kadam, Jubainsharma, Naitik Mehta, Arpanpatel, Prof. Hansraj Khande, ”Design and development of adaptive front light system (AFS)”, International Research Journal of engineering and Technology (IRJET), Vol. 3, Issue. 5, May 2016.
- [10] Vaishali D. Todkar, Mrs. M. R. Bachute, Research article, ”Survey on Adaptive Front light system”, International Journal of Advanced research (2016), Vol. 4, Issue. 4.