ADAPTIVE FRONT LUMINOUS SYSTEM OF ROADSTER ON A WAY USING ARDUINO

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Abstract

Today's driving a car at night time is become unsafe with conventional front luminous system. Due to light falling on road from front luminous system of car in straight line during turning and curving, fatal collision take place due to glare produced on windscreen of a car by high intensity of light beam from front luminous system and also the avoiding traffic rules by the drivers Therefore, it is of great importance to use available technology to contribute to road safety by improving the visual conditions provided by vehicle headlights. The aim of this project is to design a simple and an adaptive headlight system (AHS) of a car which provide better visibility to driver and improve the safety of passengers of car by sensing the intensity of headlight, distance between vehicle and judging the traffic conditions and also the steering wheel movement. In this, headlamp moves as per the wheel movement as per the steering wheel move on turning of a **road** *to provide better visible area. And also automatically changes of vehicle head lights from either low beam to high beam or high beam to low beam as per the traffic condition and the distance between the oncoming vehicle and subjected vehicle to avoid glare problem causing blind spot, since driver cannot switch normally between low beam and high beam frequently when it is needed. In this way adaptable front luminous system will help to avoid accident, improve safety and also the visibility at night time on way.*

Keywords: *AHS, Steering Wheel, Glare, Headlamp, Low Beam, High Beam.*

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1. INTRODUCTION

According to accident traffic data mostly accidents occur at night time with conventional front luminous system specially at cornering of road and traffic. Due to improper illumination of road and poor visibility. It because light falling on road from current conventional headlight is straight without any consideration of steering wheel movement and also the not quick change from high beam of light to low beam of light or vice-versa when needed causing glare on the windscreen of car producing blind spot.

The model helps them to change the focus of headlight as the steering move on either direction[1]. Adaptive headlights react to the steering system of the car and automatically adjust to illuminate the road wheel. When the car turns right, the headlight angles to the right. Turn the car left, the headlights angles to the left. The intensity of beam of light is changes automatically from high to low or vice versa according to calculated distance between oncoming vehicle and subjected vehicle and also the sensing the traffic conditions.[2]

In Figure1 control of headlamp of vehicle by Adaptive headlight System (AHS) system is shown: according to steering wheel angle, headlamp angle of rotation is control and road is correctly illuminated where fixed conventional headlamp cannot illuminate dark areas when vehicle turning or cornering on road at night time. And thus safety and visibility of driver is improved with this Adaptive headlight System (AHS) during night time.

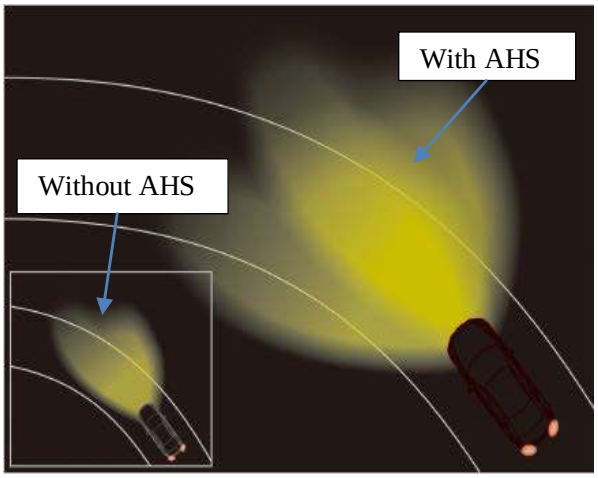

Fig-1: Control of Headlight on corner of road

In Figure 2 control of intensity of headlight on the basis of distance between incoming vehicle and the subject vehicle is shown, according to the distance between incoming vehicle and subject vehicle which sensed by the ultrasonic sensor, then it is given to the arduino and it will changes the voltage from minimum to maximum as per the distance and the intensity of beam of headlamp will decrease or increase. If distance is large, voltage is maximum that is full and light beam is full. And if distance is small, voltage is minimum

that is small and light beam became deem. And thus blind spot due to unnecessary light intensity is minimized and driver gets better visibility at night time. And thus driver can drive a vehicle safely with better visibility.

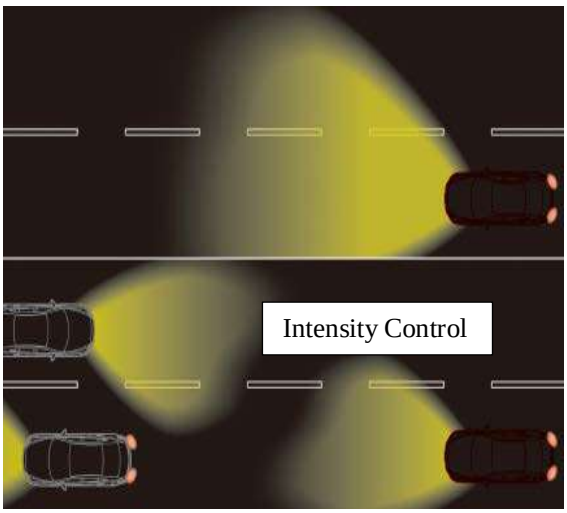

Fig-2: control of Intensity on the basis of distance between incoming and subject vehicle

2. PROBLEM DEFINITION

At night time when driver turn the steering wheel on the cornering of road the front wheel turn on a curvature or circular path and thus vehicle moves on it. The circular path is defined by the movement of the wheel and angle position of the front wheel. At this time focus of conventional headlamp is not proper on road, so driver gets difficulties while turning on road and sometimes accident occurs.

Sometimes when high intensity light from incoming vehicle falling on the windscreen of a subjected vehicle, it creates glare which produces blind spot. Due to this driver cannot able to see proper road and he or she turn blindly and accident occurs at night time.

3. METHODOLOGY

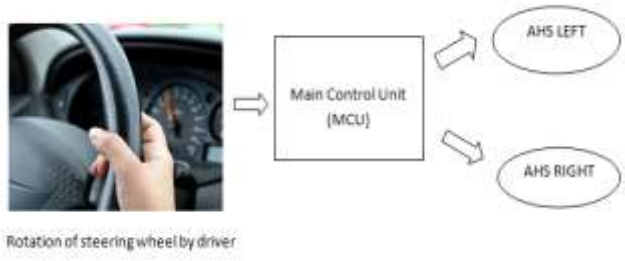

Fig-3: Hardware Loop Diagram

The Adaptive Headlight System (AHS) for vehicle to control intensity of headlight by sensing distance between subject vehicle and incoming vehicle and also the intensity of light from headlight of incoming vehicle. And also control position of both headlamp as per the movement angle of steering wheel on cornering or turning of road to provide better visibility and safety to driver and passengers, block diagram is presented in figure 3.

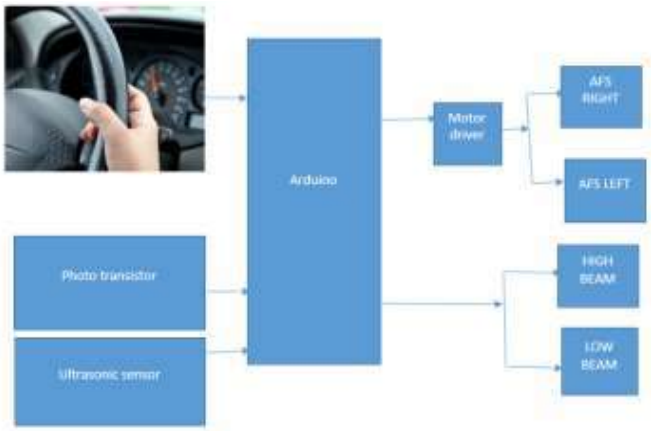

Fig-4: Conceptual Block Diagram

Above Figure 4 shows the conceptual block diagram of the AHS system. As per the driver moves steering wheel, according to rotation angle of steering wheel, headlamp of car will turn either left or right those synchronized with steering wheel. These headlamp movement controlled by motor driver. So that the proper light of headlamp is on road and driver is able to see the proper road with better visibility.

Ultrasonic sensor senses the distance between the incoming vehicle and subject vehicle and it is given to Arduino. And Phototransistor senses the intensity of light beam coming from incoming vehicle and output given to arduino. According to arduino output, light beam of headlamp changes from low to high or high to low as per intensity of light coming from incoming vehicle and the distance. If the distance is small, intensity of light beam becomes low and if distance is long it becomes high. And thus it provides better visibility to driver at night time.

4. CONCLUSION

At night time, driving a vehicle on cornering of road can be quite challenging. No illumination on turns due to fixed headlamps makes it difficult to accommodate for sharp turns. Lack of visibility at turns in narrow roads can prove to be fatal collision of vehicle and it harms the passengers in vehicle.

The steerable headlights from conventional static headlamps help to avoid accidents. Moving the headlights from left to right or vice versa continuously corresponding to a steering wheel.

An advantage of the adaptive headlight system is in its high adaptability as it can be easily configurable. The problem of visibility at night time due to unnecessary light from headlight of one vehicle falling on windscreen of another vehicle causing glare or blind spot is minimized by lowering the intensity of beam of light if distance between vehicles is less and vice-versa, controlled by Arduino.

ACKNOWLEDGEMENT

I express my sincere thanks to everyone who supported me for writing this review paper. I am thankful for their guidance and advice during this work. I express my warm thanks to Assistant Professor S.S. Tamboli for her support and guidance at Department of Electronics and Telecommunication Engineering; Annasaheb Dange College of Engineering and Technology, Ashta, 416301; Maharashtra, India.

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