Design And Develpoment Of Adaptive Headlight System

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Abstract- This research paper deals with the design of adaptive headlight system was implemented on a passenger car using Arduino microcontroller. According to traffic accident data, the maximum of server road accidents occurs at night vision. Active safety systems can be designed to avoid these types of accidents and increase degree of safety in automobiles. This work is aimed to increase the durability of the lighting system of four-wheeler. This prototype model is focus to achieve active and passive safety system. For this model, we are using sensors like ultrasonic sensor for horizontal displacement of headlight.

Keywords- Arduino microcontroller, Headlamp, Ultrasonic Sensor, Stepper motor.

I. INTRODUCTION

Preventive and active safety of road vehicles is one of the top priorities in car design and development nowadays. The rate of accident are much and more at the night drive then at the day light, for avoiding this accident this concept are very useful for automobile. The reason has to why focus on the subject of producing the safety car is related to the statics the expose the serious consequences of accident in 2014 out of 6,98,451 accident 4,882 people dead and remaining people has injured with a corresponding financial loss in India Now a days world are going on the mechatronics, by using the mechatronics system Mechanical linkage are reduced. The main objective of using mechatronic system is reduced weight of vehicle by reducing mechanical linkage. In this paper introduce Adaptive headlight system (AHS) which totally based on the Mechatronic system by using Microcontroller, Sensor and Motor. The Adaptive Headlight System (AHS) is the outcome of engineering efforts in developing the next generation lighting systems not only for drivers but also for all other road users. AHS is introduced in order to prevent a possible accident from happening by increasing the visibility at night. AHS automatically adjusts the light to match the direction of travel. AHS significantly enhances driving safety in the dark by dynamically adjusting the headlights according to the car's current direction of travel to ensure optimum illumination of the road ahead and to give the driver much better visibility.

II. LITERARURE SURVEY

[1] Mohite Harshal: This paper analyses the idea about intelligent and adaptive headlight with EPS system. The aim is to improve the visibility for the drivers thereby achieving avoid the accident in the night vision more efficiently.

[2] Jyotiraman De: This paper analyses the Universal adaptive headlight system provides the ability to illuminate the road at sharp turns or corners continuously corresponding to the angular rotation of sensor which is attached to the steering. An advantage of the developed headlight system is in its high adaptability as it can be easily configured to fit on the bumper in variety of vehicle designs. Simple comparator based circuit is used which uses very simple logic and makes it most economical to use. This ensures higher degree of active safety in vehicles and assistance to driver.

III. SYSTEM DESCRIPTION

BLOCK DIAGRAM



Fig 1: Block Diagram

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IV. WORKING & DESIGN

- The main components are ARDUINO microcontroller, ARDUINO microcontroller board, ultrasonic sensor, stepper motor, headlights.
- The program is first saved in Arduino microcontroller.
- Instead of battery, we used an USB cable to get the power from the laptop and then the power is send to the microcontroller..
- When the supply is given, the system activates.first headlamps are at normal position.
- Now, as we rotate the steering wheel in anticlockwise direction, the tie rod moves towards right.
- This increases the distance between ultrasonic sensor and the acrylic sheet placed infront of it.
- The microcontroller process the analog input signals and convert them into digital form. The processed digital data is sent to the steeper motor as input signal.
- Similarly process repeats as we turn the steering wheel in clockwise direction.
- It works on the input according to the saved program, and sends output signal to the driver controlling stepper motors.
- Thus the corresponding turn of headlamp is obtained with respect to the input from the steering wheel.



Fig 2:Steering mechanism design.

V. PROGRAMMING

The Arduino Uno can be programmed with the Arduino software (download). Select "Arduino Uno from the Tools > Board menu (according to the microcontroller on your board). For details, see the reference and tutorials. The ATmega328 on the Arduino Uno comes preburned with a bootloader that allows you to upload new code to it without the use of an external hardware programmer. It communicates

using the original STK500 protocol (reference, C header files). You can also bypass the bootloader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header; see these instructions for details. The ATmega16U2 (or 8U2 in the rev1 and rev2 boards) firmware source code is available. The ATmega16U2/8U2 is loaded with a DFU bootloader, which can be activated by:

- On Rev1 boards: connecting the solder jumper on the back of the board (near the map of Italy) and then resetting the 8U2.
- On Rev2 or later boards: there is a resistor that pulling the 8U2/16U2 HWB line to ground, making it easier to put into DFU mode.

You can then use Atmel's FLIP software (Windows) or the DFU programmer (Mac OS X and Linux) to load a new firmware. Or you can use the ISP header with an external programmer (overwriting the DFU bootloader). See this user-contributed tutorial for more information.

VI. CONCLUSION

- This type of lighting system provides the better vision to the driver by turning according to the direction of the steering wheel. It helps to remove "blind spot" and improve the driver's visibility at night time.
- This paper proposes the new system which is based on ultrasonic sensor as input sensor to adjust the horizontal movement of headlamp.
- This newly proposed Adaptive headlight system (AHS) helps to improve driver's visibility at night time hence achieving enhance safety.
- The work mainly concentrates on to invent an AHS system which can be suitable for complex road conditions, corner, highway, rural road and so on. And make the new technology available for common vehicles cost effectively.

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