Smart Headlight For Light Moving Vehicles

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Abstract- *In the earlier days the population was less and thus the demand for the vehicles were less. Since the population increased drastically over the last few decades the demand for vehicles also increased. And eventually it lead to more accidents being caused. One such cause for accidents is the use of high beam lights while driving which are also known to cause temporary blindness. Night driving is a phenomenon governed by a number of factors. So to provide optimal illumination at all distances when vehicles are in the vicinity, a controller is designed such that speed, distance of a vehicle from another vehicle, driver action, weather condition, type of road (terrain, bend, highway) while driving are taken into account to generate the effective output intensity free of glare. Simply, an automatic high beam controller is a unit, which can automatically decide when the headlight beam needs to be lowered and when not. Our work proposes an effective automatic control of the vehicle headlamps based on the detection of head lights under night time road conditions.*

I. INTRODUCTION

Over the last few decades the rise in population saw a rise in demand for transportation. Road transportation has offered many advantages both to society and to people by providing movements of goods and individuals and making easy access to various social and economic services. But the rise in demand for transportation saw the rise of road accidents and other tragedies. Even with the fact that having lower traffic volume, 42 percent of all traffic accidents occur after dark, whereas 58 percent are fatal accidents and 67 percent are pedestrian casualties [1]. Therefore, vehicle detection during night time holds a great importance for implementation of safety features in vehicles. Uncontrolled beam intensity is a regular feature, since maintaining the intensity is at the discretion of the driver himself and not an integral part of the vehicle electronic system. The problem of glare from the more powerful lamps of passing automobiles become acute and leads to head-on collision. The increase in the number of vehicles and their speed already outspaced the improvement in roads and other traffic facilities, resulting in unsafe road travel. Headlight glare is one for the primary causes for accidents at night since repeated exposure to glare can result in eye fatigue which prove as the cause for the accidents. Nearly half of all the accidents occur at night, despite less than 25 percent of daytime accidents plying on the road between 10pm and 6am. Night driving is a phenomenon governed by number of factors. Among which am prominent intensity of traffic, type of road and vehicles, weather condition and speed The control of headlight intensity has been recently gaining momentum and research worldwide in this area has been reported. ppl have already working on this system and further improvements and modifications are included in this paper.

II. CIRCUIT OPERATION

Power supply:

Power supply is supplied to the transmitting device and the receiving device. A power supply of 12v is given to the relay switch of the receiving device and 5v to several other parts of transmitting and receiving device.

Transmitting device:

The basic functionality of the transmitting device is to transmit the signal to the receiving device.These signals indeed turn on the receiving circuit. A led is used which transmits the light for LDR of the receiving device and an IR-Tx which transmits infrared for IR-Rx for the receiving device.

Receiving device:

The receiving devices main aim is to receive the signal from the transmitting device. After the signal has been received , the LDR and IR-Rx starts to operate and then the relay switch switches from low beam to high beam.

III. FLOW DIAGRAM

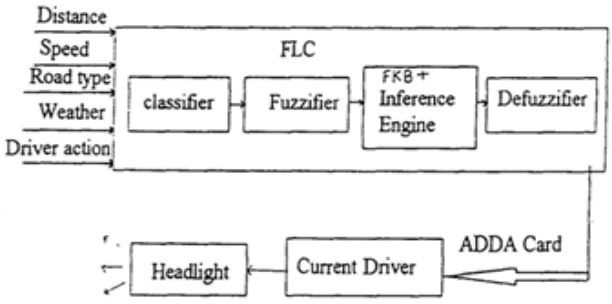

Fig:1 Fuzzy Logic Controller

IV. ADVANTAGES OF AUTOMATIC HEADLIGHT CONTROLLER

The project on which we are working on enables us to automatically shift beam intensities. This is achieved by using sensors to detect the intensity of light beam of the approaching vehicle. When the high beam of the approaching vehicle is detected, the high beam in the current vehicle is reduced to low beam. This reduces the chances of accidents. By employing this modification most accidents can be prevented at night time.
Other advantages are:

Cost efficient: cost of the components involved in very minimal.

Dual operation capability: the device can provide signal to relay switch through LDR and IR at the same time.

Automatic switching capability: whenever the relay switch receives the signal the high beam is converted to low beam and after the entire process is done the low beam is then switched back into high beam if necessary.

V. SCHEME

The system configuration includes sensor detector assembly which consists of a biconvex lens and a photodiode. The light signal from the approaching vehicle is sensed by this assembly and applied to the classifier for processing. The classifier is used to categorise the vehicle as light weight or heavy weight vehicle. The controller consists of two parameters. The distance of the vehicle with approaching vehicle is sensed by a laser source mounted at the front end of the vehicle. An optical encoder is incorporated to measure current speed. All these inputs are applied to the controller. The classifier module in the controller identifies the category of the oncoming vehicle. The controller output gives the desired intensity of the headlight implementation of fuzzy logic:

A fuzzy logic controller consists of classifier, rulebase, fuzzifier, inference engine and defuzzifier.

In the fuzzification process, numerical inputs are converted into linguistic fuzzy values. From the fuzzy values and rulebase, linguistic control values are generated by the Inference engine. Since these linguistic inference results cannot be used in actual system, they are to be converted into numerical output again by the fuzzification process. MAX-MIN composition and the weight counting method is used in the inference engine and fuzzification of fuzzy logic respectively.

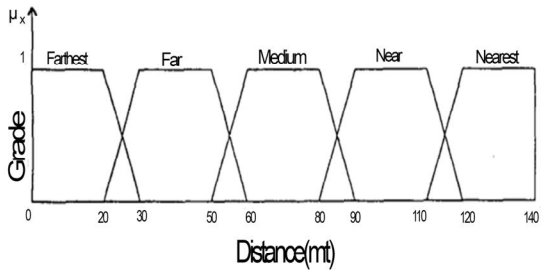

Fig 2: Membership Function for Distance

VI. DISADVANTAGES OF THE EXISTING SYSTEM

Existing systems have some demerits with regards to its operation. The driver has to manually change between high beam and low beam during the course of the journey on the highway so that it doesn't affect the vision of the approaching vehicle and prevents accidents.

When a driver is to come across an opposing vehicle he must manually control the intensity by lowering the beam, which in most cases they fail to do and in return increase the rate of accidents. Due to the uncontrolled light intensity, it causes head on collision with the vehicle from the opposite direction.

VII. CONCLUSION

Road accidents increase drastically day by day especially when drivers don't follow the basic rules and regulations. Thousand of people have lost their lives in road accidents every year.

In this paper a method for intelligent headlight switching is presented. Even if there is absence of light the device work through IR technology. Many researchers have worked in area of night time vehicle detection for headlight control. Some automotive manufacturers have implemented similar systems into their vehicles. As a result this will help us reduce accidents if not drastically but at least to a certain level that can make an huge impact in the society.

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