ADAPTIVE DRIVER ASSISTANCE USING AUTOMATIC HEADLIGHTS

Suraj M. Gend , Snehal A. Jadhav , Pooja R. Sarode , Anmol Sharma

Abstract—

This paper presents the adaptive driver assistance using automatic headlights. Headlights of vehicle are inherent for night driving [2]. The driver of most vehicles uses high, bright beam while driving at night time. These bright headlights which assist the driver for better vision, may cause a discomfort to the person travelling from the opposite direction (oncoming driver) in the form of glare for short period of time. Once they spot an oncoming vehicle within 150 meters in order to reduce the glare as a rule during night driving, every driver is supposed to switch their headlight from high beam to low beam [2]. This is one of the major causes of accidents during the night, as the opposing driver will not be able to see road clearly due to brightness of the oncoming vehicle's headlights.

The proposed project is designed for controlling intensity of car headlight during night driving. The system uses Light Dependent Resistor (LDR) to sense the light coming from oncoming vehicle's headlight. Depending upon the measured intensity of light by LDR, Arduino calculates required amount of intensity of light then, it increases or decreases the light intensity accordingly. This avoids sudden glare cause to human eye. This will also avoid manual switching of headlight beam. Maximum spread angle of headlight beam was observed at 135^{o} [1]. At the same time the spread light from other source reached the sensor its intensity would be very much reduced below the triggering threshold level [1]. Although, the system should be mounted in both the vehicles moving in opposite direction.

***Index Terms*- Headlight dimmer, LDR (Light Dependent Resistor), Human eye glare effect, arduino**

I.INTRODUCTION

The requirement of headlight is very necessary during the night travel. The headlights which assist the driver for better vision during night travel is also responsible for many accidents that are being caused. The headlight has to be adjusted according to light requirement by the driver .The driver has the control of the headlight which can be switched from high beam (bright) to low beam(dim). During complete black (dark) conditions where there are no other sources of light , high beam of headlight it used. On the other cases , low headlight beam is used.

In case of two-way traffic, there are vehicles running on both sides of the road. So, when the bright light from the headlight of a vehicle coming from the opposite direction falls on a person, it glares him for a certain amount of time. This causes disorientation to that driver. This discomfort will result in involuntary closing of the driver's eyes momentarily. This fraction of distraction is the prime cause of many road accidents [2] .

In this proposed project , switch the bright headlight of the vehicle to low beam automatically when it senses a vehicle at close proximity approaching from the other direction and switch it back after the vehicle passes. The entire working of the dimmer is an electronic circuit arrangement which senses and switches the headlight accordingly.

II. PROBLEM STATEMENT

Road accidents occur every day with the higher percentage of occurrences at night. This is because visibility at night is not as good as that at the day time. The importance of bright driving lights to a vehicle has as much an opposite effect on the opposing vehicle, hence the need to reduce that effect. Drivers are human and tend to forget to switch the beams, which is a task that has to be done over and over, and this can be tiring. When our eyes are exposed to a very bright source of light, around 1000 lumens, we experience a glare. This glare is produced due to over exposure of the rods and cones inside our eye. Even after the source of glare is removed, an after-image remains in our eye that creates a blind spot. This phenomenon is called the Troxler effect [4]. The Troxler effect increases driver reaction time by up to 1.4 seconds. This means that when traveling at 100 km/h, it would take the driver 37.5meters to see and react to road hazards [5].

III. MAIN BODY OF THE PAPER

When the light beam of headlight coming from vehicle traveling in opposite direction is incident on

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the light sensing element .This incident light beam converts energy from analog to digital .This intensity of light is measured and required amount of light is calculated then converted into analog again.

1. Block Diagram :-

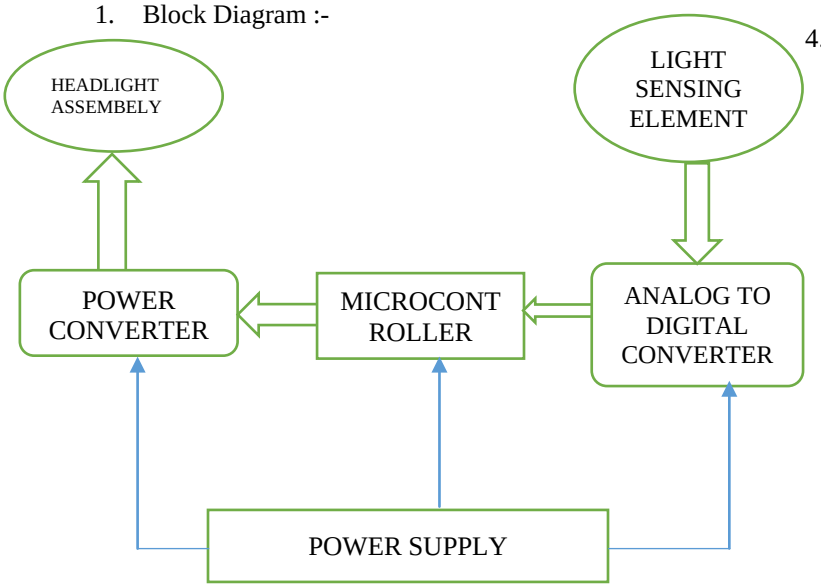

Fig.1: Block Diagram for system device

2. Circuit Diagram:-

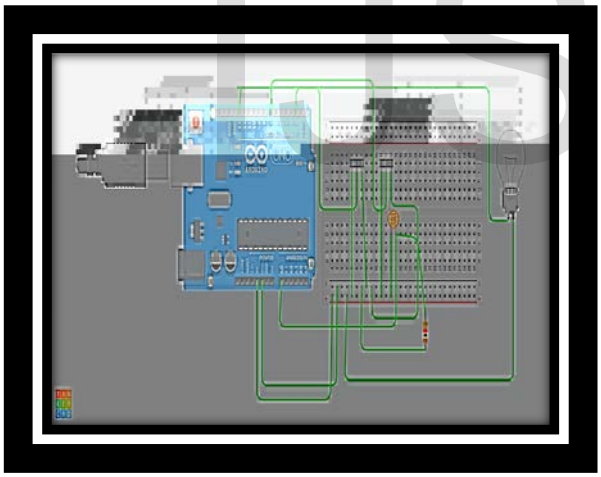

Fig.2: Circuit diagram of device

3. Working :-

In our system there must be a provision of two modes – 1} auto mode
2} manual mode

The user will decide the use of both mode . The light sensing element which is nothing but the LDR, senses the daylight and the count or voltage levels gives it to the analog to digital conversion process which is readily available in our microcontroller internally. It will convert the analog signal into digital signal and gives it to the relay driver IC which is nothing but the ULN 2003. The IC will convert an low level voltages into high level, to drive the high voltage headlights. After that whatever intensity which is sensed by an light sensing element controller will pass that much Voltages to the headlight which will controls the intensity of headlights and the motto of our project is satisfied.

4. Demonstrative Images :-

Fig.3: High beam is activated when there is no vehicle coming from the opposite side

Fig.4: Low beam is activated when there is vehicle approaching from the opposite side

VI. CONCLUSION

The following criteria must be considered when placing the device in a real vehicle:

1. It should be kept at a safe place, protected from external environment like rain, and dust.

2. The placement of this circuit should be in line with the eye of the driver, so that it responds exactly in the same way how a driver would react to the bright light.

3. The circuit should have a constant supply whenever the headlights are turned ON.

4. It should be compact and easy to install.

In the circuit, by using suitable adjustable resistors, the circuit's sensitivity can be tuned to the appropriate requirement. It can be made sensitive for a wide range of light beam by just varying the balance condition of the potential divider network. Therefore, the driver can manually adjust the sensitivity level so that it can

be customized for his personal driving comfort**.[1]**

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