

# Automatic Headlight System for Automotive Safety

VIDYASAGAR P. M<sup>1</sup>, SYED SHOAIB<sup>2</sup>, SHIVA PRASAD M<sup>3</sup>, SATHWIK KASHYAP R<sup>4</sup>, LETHAN M.N<sup>5</sup>

<sup>1,2,3,4</sup>UG Student's Dept. of Electronics and Communication Engineering, Maharaja Institute of Technology Mysore, Karnataka, India

<sup>5</sup>Associate Professor, Dept. of Electronics and Communication Engineering, Maharaja Institute of Technology Mysore, Karnataka, India

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**Abstract** -This paper presents the research work done in the field of automotive safety. As head light are the major important in night drives but up and highs of light as per requirement, but intensity of head light has to be taken care which is not available in automotive In this work a headlight system is made by using Arduino, sensors, LDR and other accessories. A multi featured headlight system provides facility of automatic switching of headlight from high beam to low intensity beam necessary conditions. Also this model eliminates the requirement of manual switch by the driver as switching takes place automatically. The feature of this model is automatic light intensity adjustment with respect to opposite light beam. This concept is very useful in the automobile field applications, which provides safety of driver during driving

**Key Words:** Head Light, Automotive Safety, Arduino, LDR, Light Intensity

## 1. INTRODUCTION

The technology has paved our path to sophisticated life .In the automobile sector there has been significant technologies which attributes to ease the driving. The beam intensity of the vehicle plays an important role while driving. When driving vehicle at night even with less traffic on the road, more than half of accidents occur, because headlight glare is a major issue that has grown in terms of public awareness over the past decade. High beam of headlight of an on-coming vehicle as blinding effect and decreases visibility during night driving is dangerously. The drivers of most vehicles use bright beam while driving at night. This causes a discomfort to the person traveling from the opposite direction. It causes sudden glare for a short period of time. This is caused due to the high intense headlight beam from the other vehicle coming towards him from the opposite direction. Glare causes a temporary blindness to a person resulting in road accidents during the night. This paper proposes an idea of creating an automatic headlight control for the automobiles. Thus the beam intensity has to be varied for the safety purposes. This system will sense the light intensity of the ambience and thereby helps in altering the intensity of the vehicle on which it is mounted.

The requirement of headlight is very common during night travel and different environment condition. The

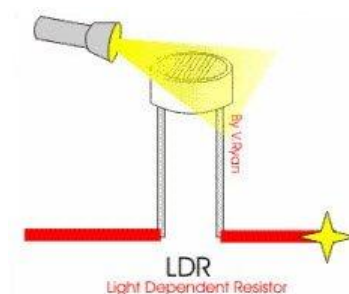
same headlight which assists the driver for better vision during night travel is also responsible for many accidents that are being caused. The driver has the control of the headlight which can be switched from high beam (bright) to low beam (dim). The headlight has to be adjusted according to the light requirement by the driver. The prototype that is has been developed, reduces this problem by actually dimming down the bright headlight of our vehicle to low beam automatically when it senses a vehicle at close proximity approaching from the other direction. The entire working of the dimmer is a simple electronic circuit arrangement by the use sensor with Arduino which senses and switches the headlight according to the conditions required

## 1.1 Methodology

This circuit consists of a simple assembly of components such as LDR, Resistor, Relay, Ultrasonic Sensor all connected to an Arduino. The components chosen provide accuracy keep the design simple to implement.

In this project we use Light Dependent Resistor as a light sensing device which sends its reading to Arduino which computes and decides the switching of the Head Lights.

The Relay circuit helps the Arduino in controlling the Head Lights. Normally the resistance of LDR is very high but when light falls on it the resistance drops



## 2. WORKING

The Project works on the light intensity of the vehicle coming from opposite direction. The LDR placed at multiple locations of the vehicle senses the light intensity and the readings of these LDR's is read by Arduino which

compares the readings of the LDR with the corresponding predefined threshold value set in the code of Arduino. If the intensity of the light falling coming from the opposite vehicle is higher than the threshold value the Arduino automatically switches the Head Light to low beam through Relay circuit

A delay of few seconds can be given to the Arduino so that once the switching happens it gives a few seconds to the vehicle to pass and then it switches back to high beam

An Ultrasonic sensor can also be added to make the circuit even more efficient. The Ultrasonic Sensor senses the distance of the approaching vehicle and when the vehicle comes at a specific distance the Ultrasonic sensor alerts the LDR to check the intensity of the light. If the intensity is less than the threshold no action is taken. But if the intensity is greater than the threshold the Head light is switched to Low Beam.

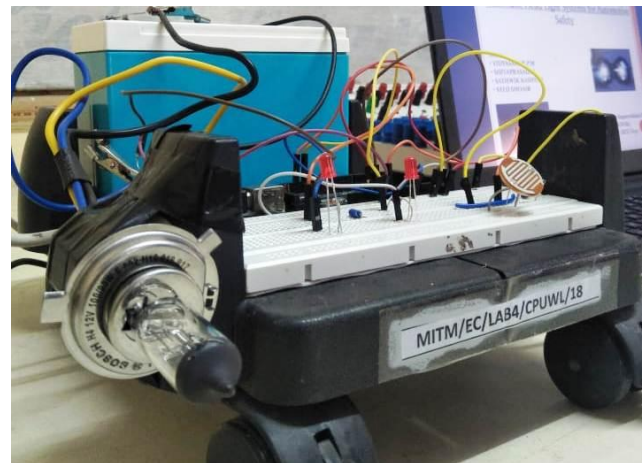


Fig-2: A Sample implementation of the prototype as well as the Original Circuit

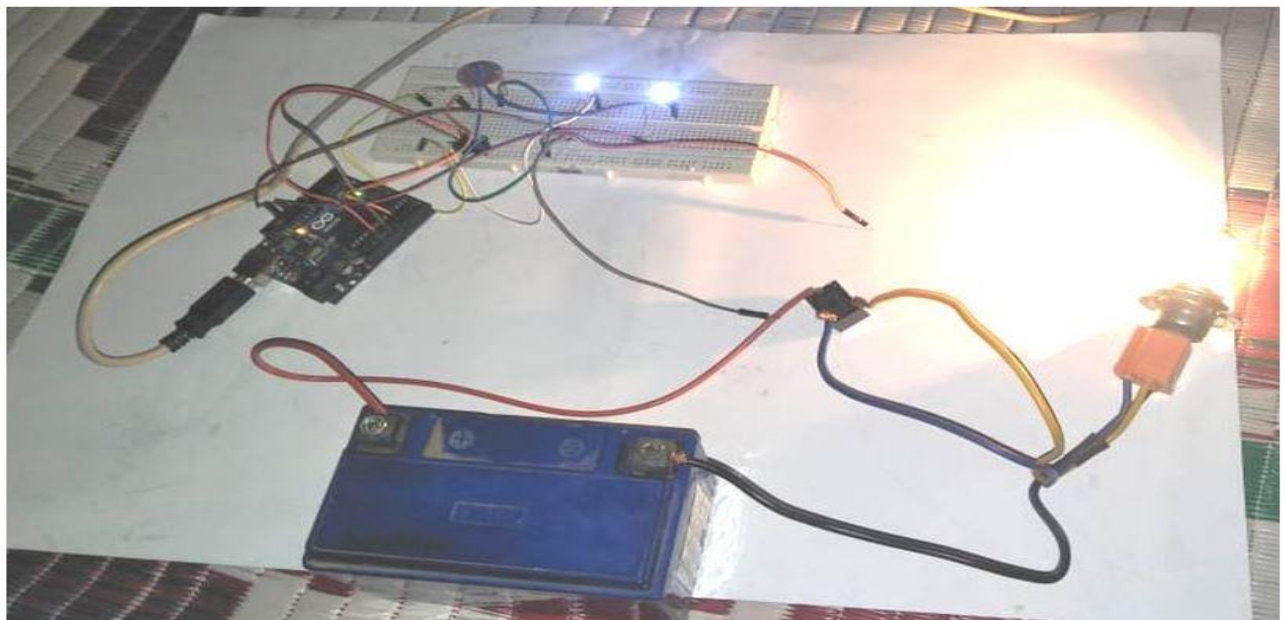
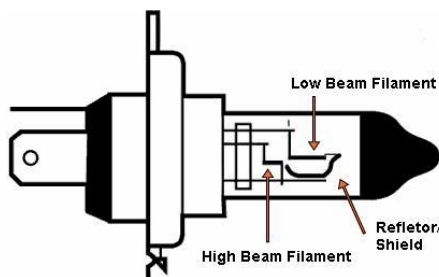


Fig: Assembly of prototype using LED's as well as the original circuit using Head Lights

### 3. ADVANTAGES and APPLICATIONS

There are many advantages like it is easy to install, the circuit is not much complex, cost effective, easily adaptable and effective in all kinds of vehicles.

It is applicable in all types of automobiles like Mopeds, Bikes, Cars, and Trucks etc.

### 4. ADVANCEMENTS

This can be further developed by using Zigbee Technology for smarter inter communication between vehicles which would make it even simpler and smarter.

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### BIOGRAPHIES



VIDYASAGAR P M,  
UG Student, Department of  
Electronics & Communication,  
Maharaja Institute Of Technology  
Mysore, Mysuru, Karnataka,  
India.



UG Student, Department of  
Electronics & Communication,  
Maharaja Institute Of Technology  
Mysore, Mysuru, Karnataka,  
India.



SHIVA PRASAD M,  
UG Student, Department of  
Electronics & Communication,  
Maharaja Institute Of Technology  
Mysore, Mysuru, Karnataka,  
India.



SATHWIK KASHYAP R,  
UG Student, Department of  
Electronics & Communication,  
Maharaja Institute Of Technology  
Mysore, Mysuru, Karnataka,  
India.



Lethan M.N  
Assistant Professor, Department  
of Electronics & Communication,  
Maharaja Institute Of Technology  
Mysore, Mysuru, Karnataka, India