

AUTO REACTIVE HID HEADLIGHTS FOR VEHICLES

Prof. Veena N Iter, Ravichandra G, Prajwal Gowda PR, Sandeep Chauhan, Shashank GS

Dept of Information Science and Engineering

East West Institute of Technology, Bangalore-91

Abstract — The headlight during the night travel plays a major role. While driving there may be an irritating situation due to the headlight lamp focus from the opposite vehicle. It may cause temporary blindness that leads to collision or sometimes it may lead to accidents. There is a manual way to adjust the headlight focus but it is difficult to adjust manually. This project provides an automated headlight management system. Here, the headlight beam is reduced in the vehicle according to the intensity of light from the opposite vehicle. LDR is used to detect the high beam from the opposite vehicle. The system can also control the horn of the vehicles at certain important and restricted places or locations such as hospitals and school zones to prevent unnecessary noise generation. If the driver has put the horn in restricted places automatically amount will be deducted from the driver account send the intimation message to the mobile number.

I INTRODUCTION

High beam from the headlight causes a dangerous situation during night driving. It causes temporary blindness for the drivers that may lead to collision or sometimes it may lead to accident. Pedestrian crossing the road may get hurt. Almost 30% of accidents occurring due to headlight glare. When enough streetlights are available, there is no need of headlight beam with such high intensity. This project helps to automatically control the headlight glare in motor vehicles. LDR is known as light dependent resistor, its resistance varies according to the intensity of light falling on it. Microcontroller used here is arduino uno. Microcontroller controls the high beam falling on it. When a high beam falls on the surface of LDR, the information passes to the microcontroller. Microcontroller compares the intensity of incoming light with the desired intensity value. When the intensity value is increased beyond the desired intensity value, it reduces the intensity of light and provides a great relief for the driver from the irritating situation that occurs during the night driving.

Another important objective of the proposed system is to minimize the sound pollution of special zones ceasing the horn sound of the vehicles. It is also done by circuit placed in the vehicle after receiving the data from speed limiter device. The main purpose of using a horn is to alert the other vehicles and pedestrians about the presence of a vehicle. Due to the increase in the vehicle the amount of noise pollution, that is generated by these vehicles have increased significantly. During traffic when there is no chance to let way people tend to press the horn for a long time, this has, in turn, caused disturbances and hence, in some areas such as in the hospital, central cities, near the school etc, honking is prohibited by law or regulation. In order to use the horns reasonably, we have restricted the number of the horn to be pressed the driver can only use a certain number of horns per hour. In case the horn exceeds, then fine will be charged from the concerned and the duration of the horn is also limited. If not paid then the car will be locked. So by this proposed work the owner will be intimated via message and audio played in the vehicle about the last date in order to alert the pay the extra horn amount on time without any inconvenience.

Problem Statement

More than 30% percent of accidents during night time happen due to headlight glare. The visibility during night time also

reduced due to fog. The correct use of dipper (low beam) during night is essential for the drivers in the presence of street light. The unwanted use of high beam may lead to unnecessary crashes. A survey says that 26.5% alone use dipper correctly out of 73.83%, remaining 48.3% continued in high beam itself and the remaining 25.53% dipped the light for a few seconds and continued to be in a high beam. Some of the technologies that are used to control high beam of headlight are LDR based intensity control, Fuzzy logic based intensity control, wireless sensor network method, IR transmitter-receiver method, and camera based intensity control, pulse width modulation method. In this project we used LDR based intensity control method. Almost 1,200 luminance of light intensity in case of high beam is more than enough to view the potential obstacles and also to react. But sometimes owners replace the headlight with about 2000-3000 luminance of intensity. This may lead to unavoidable crashes.

Objectives

Most of the accidents during night occur due to the high amount of light falling on the vehicle. It cause glaring and troxler fading that leads to accident. To overcome this problem the intensity of light falling on the other vehicle should be reduced automatically. There is manual adjustment of intensity of light but it is difficult to adjust manually during some situations. To overcome this problem, automatic adjustment of light is needed which is described in this paper. LDR is used to measure the amount of intensity of light falling on the vehicle. When the LDR detects the large amount of intensity of light falling on it, the microcontroller reduces the amount intensity of light in the vehicle. This gives the clear vision for the drivers. Thus, it prevents the collision and accidents before occurring it Systems design is the process of defining the architecture, modules, interfaces and data for a system to satisfy specified requirements. Systems design could be seen as the application of systems theory to product development. There is some overlap with the disciplines of systems analysis, systems architecture and systems engineering. If the broader topic of product development "blends the perspective of marketing, design, and manufacturing into a single approach to product development," then design is the act of taking the marketing information and creating the design of the product to be manufactured.

Systems design is therefore the process of defining and developing systems to satisfy specified requirements of the user. Until the 1990s, systems design had a crucial and respected role in the data processing industry. In the 1990s, standardization of hardware and software resulted in the ability to build modular systems. The increasing importance of software running on generic platforms has enhanced the discipline of software engineering. Objectoriented analysis and design methods are becoming the most widely used methods for computer systems design. The UML has become the standard language in object-oriented analysis and design.

It is widely used for modeling software systems and is increasingly used for high designing non-software systems and organizations. It is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy the specific requirements. Before planning, you need to understand the old system thoroughly and determine how computers can best be used in order to operate efficiently. System Design focuses on how to accomplish the objective of the system.

II REQUIREMENT SPECIFICATIONS

Hardware Requirements:

- Arduino Uno
- Nodemcu
- Sound Sensor
- LDR
- LED
- Switch
- Buzzer
- H-Bridge
- DC Motor
- Relay
- Power supply

Software Requirements:

- Arduino IDE
- Embedded C

Arduino Uno:

Arduino/GenuinoUno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases



FIG 1: ARDUINO UNO

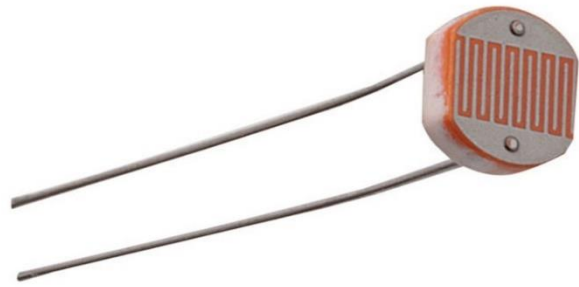


FIG 2: LDR

A photoresistor or light dependent resistor is an electronic component that is sensitive to light. When light falls upon it, then the resistance changes. Values of the resistance of the LDR may change over many orders of magnitude the value of the resistance falling as the level of light increases. The operating voltage is 5v

- Can be used to sense Light
- Easy to use on Breadboard or Perf Board
- Easy to use with Microcontrollers or even with normal Digital/Analog IC
- Small, cheap and easily available
- Available in PG5 ,PG5-MP, PG12, PG12-MP, PG20 and PG20-MP series

RELAY



FIG 3: RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. The relay's switch connections are usually labeled COM(POLE), NC and NO. In order to trigger the laser we use driver relay.

Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations

LCD

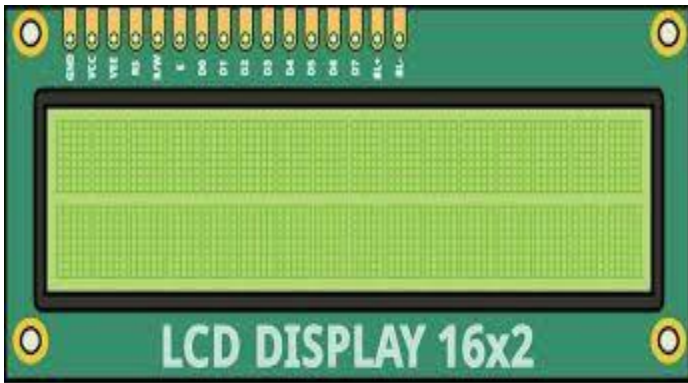


FIG 4: LCD DISPLAY

A **liquid-crystal display (LCD)** is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome.

LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock.

They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

LCD is used in wide range application including computer monitors, televisions, instrument panels, aircraft cockpit displays, and indoor and outdoor signage.

Small LCD screens are common in portable consumer devices such as digital cameras, watches, calculators, and mobile telephones, including smart phones.

LCD screens also used on consumer electronics products such as DVD players, video game devices and clocks. LCD screens have replaced heavy, bulky cathode ray tube (CRT) displays in nearly all applications.

LCD screens are available in a wider range of screen sizes than CRT and plasma displays, with LCD screens available in sizes ranging from tiny digital watches to huge, big- screen television sets.

Since LCD screens do not use phosphors, they do not suffer image burn-in when a static image is displayed on a screen for a long time (e.g., the table frame for an aircraft schedule on an indoor sign). LCDs are, however, susceptible to image persistence.

Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts.

The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. The relay's switch connections are usually labeled COM(POLE),

NC and NO. In order to trigger the laser we use driver relay. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays.

Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.

The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit.

Relays were used extensively in telephone exchanges and early computers to perform logical operations.



FIG 5: RELAY

The IoT Power Relay is designed to allow you to safely control an outlet device that operates at 3--48VDC or 12--120VAC. Each IoT Power

Relay features a single input (from the included C13 power cable) to four outputs: one normally on, one always on, and two normally off.

Simply put, a relay receives electrical signals from the switch, etc. and passes them to the output part such as a motor.

EMBEDDED C LANGUAGE

Embedded C is an extension to C programming language that provides support for developing efficient programs for embedded devices. It is not a part of the C language. C is the most widely used programming language for embedded processors/controllers. Assembly is also used but mainly to implement those portions of the code where very high timing accuracy, code size efficiency, etc. are prime requirements.

Arduino IDE (Integrated development Environment) is fully developed into functionality of full of libraries, as long as programming the Arduino UNO in Embedded C language is possible because Arduino IDE can compile both Arduino code as well as AVR standard code.

- When designing software for a smaller embedded system with the 8051, it is very common place to develop the entire product using assembly code. With many projects, this is a feasible approach since the amount of code that must be generated is typically less than 8 kilobytes and is relatively simple in nature. If a hardware engineer is tasked with designing both the hardware and the software, he or she will frequently be tempted to write the software in assembly language.
- The trouble with projects done with assembly code can be that they can be difficult to read and maintain, especially if they are not well commented. Additionally, the amount of code reusable from a typical assembly language project is usually very low. Use of a higher-level language like C can directly address these issues. A program written in C is easier to read than an assembly program.
- Since a C program possesses greater structure, it is easier to understand and maintain. Because of its modularity, a C program can better lend itself to reuse of code from project to project. The division of code into functions will force better structure of the software and lead to functions that can be taken from one project and used in another, thus reducing overall development time. A high order language such as C allows a developer to write code, which resembles a human's thought process more closely than does the equivalent assembly code. [25]The developer can focus more time on designing the algorithms of the system rather than having to concentrate on their individual implementation. This will greatly reduce development time and lower debugging time since the code is more understandable.
- By using a language like C, the programmer does not have to be intimately familiar with the architecture of the more portable to other systems than code developed processor. This means that someone new to a given processor can get a project up and running quicker, since the internals and organization of the target processor do not have to be learned. Additionally, code developed in C will be in assembly. Many target processors have C compilers available, which support ANSI C.

All of this is not to say that assembly language does not have its place. In fact, many embedded systems (particularly real time systems) have a combination of C and assembly code. For time critical operations, assembly code is frequently the only way to go. One of the great things about the C language is that it allows you to perform low-level manipulations of

the hardware if need be, yet provides you the functionality and abstraction of a higher order language.

III IMPLEMENTATION

Light Dependent Resistor (LDR):

LDR is a sensor that changes its resistance according to the amount of intensity of light falling on it. Increasing the intensity of light decreases the resistance and increases the conductivity of LDR. The output of LDR is an analog output. The Light Dependent resistor works on the principle of Photo conductivity i.e. the conductivity of the LDR increases by increasing the intensity of light falling on it. When the LDR is kept in dark, the resistance of it is very high that is up to 1012Ω. At the same time, when the LDR is placed in sunlight, there is a drastic fall in the resistance of LDR.

HEADLAMP:

Headlamp is attached to the front side of the vehicle to provide a light vision to the road ahead. The light beam from the headlamp is called headlight. There are two types of beam that emerges from the headlamp. They are low beam and high beam. Low beam which is also called as dipped beam, passing beam, meeting beam headlamp provide a distribution of light designed to provide lateral and forward illumination that are limited which helps to control the glare for the other road users High Beam is also called as main beam, driving beam, full beam that provides a bright, centre-weighted distribution of light and it does not possess any control of light that are directed towards the other road user's. High beam is only suitable for road with no other users, as the glare from the high beam may dazzle the other drivers

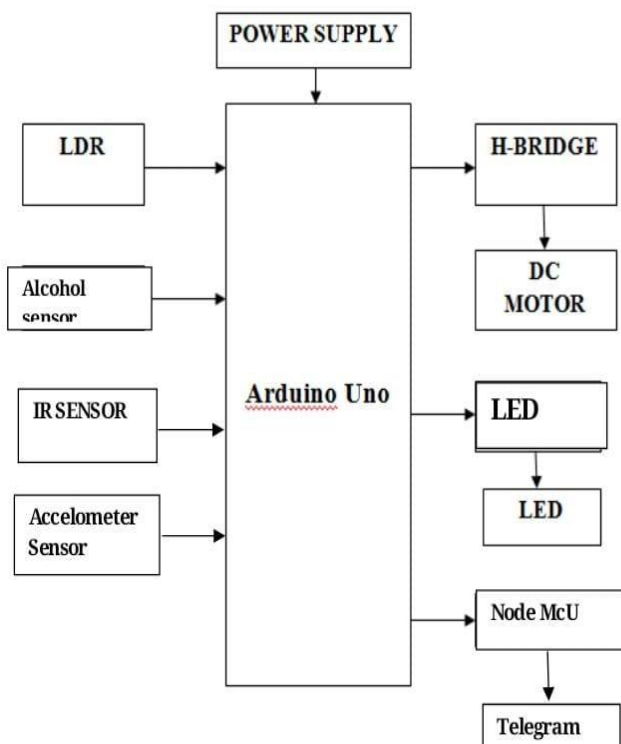


FIG 6: SYSTEM ARCHITECTURE

CONCLUSION

This project presents the automatic headlight dimmer that uses LDR. Here, high beam is automatically switched to low beam when a high beam of light from the another vehicle falls on the LDR. Glaring of light from the opposite vehicle during the night travel is one of the major problems. Though there is a manual method to reduce the headlight beam, it will be difficult during some situations. Horn restricted area detection and if any horn detected in the restricted area amount will deduct and send the message to the person. This will reduce the noise pollution This project provides an automated headlight management system. Here, the headlight beam is reduced in the vehicle according to the intensity of light from the opposite vehicle. LDR is used to detect the high beam from the opposite vehicle

REFERENCES

1. AslamMusthafa R, Bala Krishnan T, Seetha Raman N, Shankar M, Swathi R, "Automatic Headlight Beam Controller" Special Issue Published in International Journal of Trend in Research and Development (IJTRD) 15th March 2017.
2. M.Abdul Kader Riyaz, S.ArunJeyakumar, M.AbdulHameedSharik, A.Tamilarasi, "Graphene Coated LED based Automatic Street Lighting System using Arduino Microcontroller" IEEE International Conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI-2017).
3. Okrah. S.K, williams. E.A, Kumassah.F, "Design and Implementation of Automatic Headlight Dimmer for Vehicles using Light Dependent Resistor (LDR) Sensor" International Journal of Emerging Technology and Innovative Engineering Volume 2, Issue 4, April 2016.
4. G.M. Pushpanjali, P.S. Mali, and R.R. Naman, "Automatic Headlight Dipper with Respect to Upcoming Vehicles" Response International Journal on Emerging Technologies (Special Issue on ICRIET-2016).
5. SanalMalhotra, Shiv Taneja, "Automatic Brightness Control Using LDR Sensors" Advanced Research in Electrical and Electronic Engineering Volume 1, Number 2 (2014).
6. SaksheeSrivastava, "Automatic Street Lights" Advance in Electronic and Electric Engineering. Volume 3, Number 5 (2013)
7. B. K. Subramanyam, K. Bhaskar Reddy, P. Ajay Kumar Reddy, "Design and Development of Intelligent Wireless Street Light Control and Monitoring System Along With GUI" International Journal of Engineering Research and Applications (IJERA) Vol. 3, Issue 4, Jul-Aug 2013.
8. ChitradeepSarma, Ankita Gupta, Abhinav Singh, IndraniBhattacharjee, AbhilashMohanta, "Limitations of Probable Vehicle Headlight Technologies – A Critical Review" 3rd International Conference on Materials and Manufacturing Engineering 2018 IOP Publishing.
9. GhassanMaan Salim, Hashimah Ismail, NiranjanaDebnath, A.Nadya "Optimal Light Power Consumption Using LDR Sensor", 2015 IEEE International Symposium on Robotics and Intelligent Sensors (IEEE IRIS2015).
10. Rodrigo Cassio de Barros, Joao Marcus SoaresCallegari, Dayane do CarmoMendonca, "Low-Cost Solar Irradiance Meter using LDR Sensors" 13th IEEE International Conference on Industry Applications-2018.