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Automatic Dimming of Light in a Vehicle

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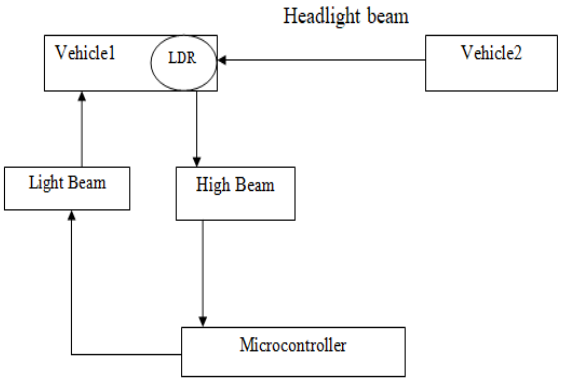
Abstract: *This paper presents the design of an "automatic light dim and dip system". In the existing system, vehicles dim, and dip is done by man(or)manually. It is important for journey during night time. Our strategy involves design, development and creating this automatic light dim and dip system. According to the law of "Indian Roads and Transport Council", low intensity light has to be used always, however in the time of overtaking or other mandatory situations, high beam can be turned on, but most of the drivers use elevated, bright beam during night driving. The individual traveling in the opposite direction experiences a sudden glare for a short period of time which leads to accidents in many cases. The automatic vehicle headlight dim and dip system adjust the intensity beam when finds the vehicles in opposite direction. It utilizes a Light Dependent Resistor (LDR) sensor was intended to dim the headlight of vehicles automatically to prevent the impacts of human eyes. It eliminates the driver's need from manual switching which was not done all time. vehicles employed with automatic dippers are not very often seen in our cities, and it may be due to lack of information about the system and also because of giving attention to the people saying that it is not at all practicable in our highways. But this system helps to reduce the accidents rate in nighttime due to the high beam headlight.*

Keywords: Light dependent resister, glare, bright beam

I. INTRODUCTION

The requirement of a headlight is very common during night travel. The same headlight which assists the driver in better vision during night travel is also responsible for many accidents that are being caused. The driver has 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 of the driver. When there is no light source like a street light in such conditions, a high beam is used. In all other cases, a low beam is preferred. But in 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 blindness to that driver. So we are using sensors for automatic dimming and dipping of lights. The prototype decreases the high beam of light of our vehicle to the low beam automatically, this gives the opposite vehicle a chance to adjust a vehicle to avoid accidents.

II. METHODOLOGY



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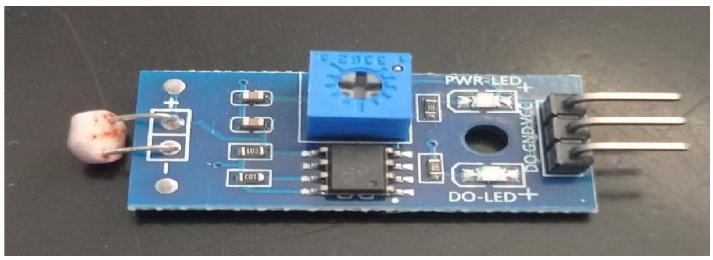
Vehicle 2 senses the high beam of vehicle 1 with the help of the Light Dependent Resistor (LDR) sensors that converts the light intensity into an electrical signal. Designing a circuit is very simple, and this is one of the best ways to approach the prototype from a distinct view.

III. COMPONENTS USED

The various components used in the circuit are

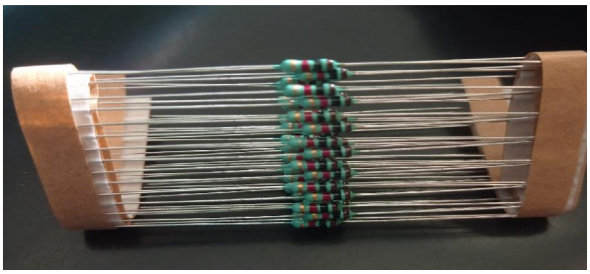
3.1 LDR (LIGHT-DEPENDENT RESISTOR)

A photoresistor (also known as a photocell, or light-dependent resistor, LDR, or photo-conductive cell) is a passive component that decreases resistance with respect to receiving luminosity (light) on the component's sensitive surface. The resistance of a photoresistor decreases with increase in incident light intensity; in other words, it exhibits photoconductivity.



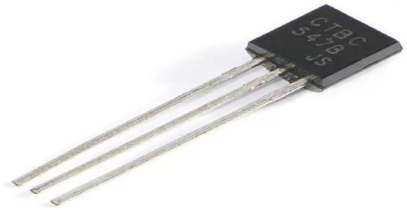
3.2 Resistors as a Potential Divider

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines



3.3 Transistor

A transistor is a semiconductor device used to amplify or switch electrical signals and power.It is composed of semiconductor material, usually with at least three terminals for connection to an electronic circuit. A voltage or current applied to one pair of the transistor's terminals controls the current through another pair of terminals.



3.4 Relay Switch

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations.

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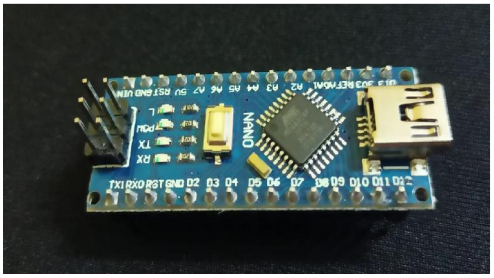
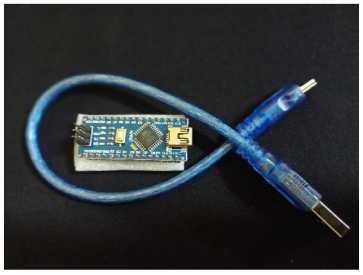
3.5 LED bulbs

An LED lamp or LED light bulb is an electric light that produces light using light-emitting diodes (LEDs). LED lamps are significantly more energy-efficient than equivalent incandescent lamps and can be significantly more than most fluorescent lamps

3.6 Micro Controller (Arduino)

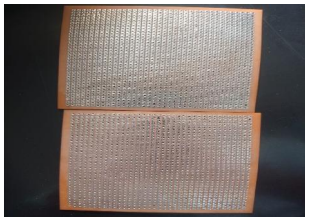
It is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices





3.7 PC Circuit

It is a medium used in electrical and electronic engineering to connect electronic components to one another in a controlled manner. It takes the form of a laminated sandwich structure of conductive and insulating layers: each of the conductive layers is designed with an artwork pattern of traces, planes and other features (similar to wires on a flat surface) etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate



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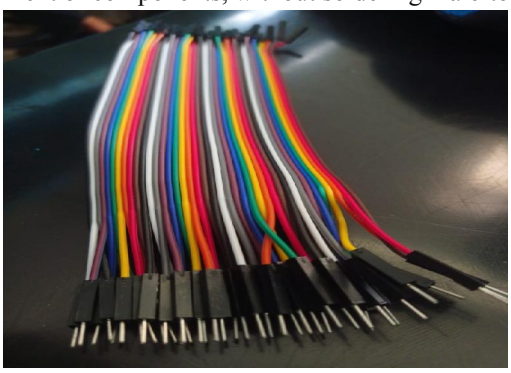
3.8 Male to female wire

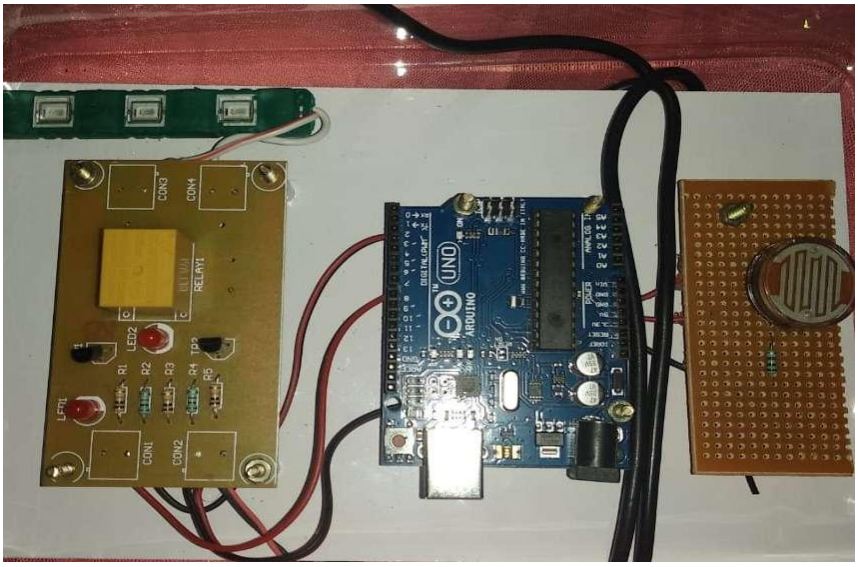
It is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering male-to-female



3.9 Female to male wire

It is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering**.**

IV. MODEL



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V. CODE TO EXECUTE THE CIRCUIT

```
int ldrpin=6;
int led=7;
void setup() {

pinMode(ldrpin,INPUT);
pinMode(led,OUTPUT);
Serial.begin(9600);
}

void loop()
!{
int step =digitalRead(ldrpin);
Serial.println(step);
if(step==1)
{
digitalWrite(led,HIGH);
Serial.println("Light on");
}
else
{
digitalWrite(led,LOW);
Serial.println("Light off");
}
delay(2000);
}
```

VI. RESULTS AND DISCUSSION

The proposed system is simple to design and implement. As the size is compact and durable, it can be easily installed in almost all vehicles. The performance of the proposed system is good when compared with many other existing techniques. An automatic headlamp dimmer of on-coming vehicles had been designed using LDR sensing technique. Thus, the system device automatically switches the headlight to low beam when it senses a vehicle approaching from the opposite side using Light Dependent Resistor (LDR) sensor.As the vehicles cross each other, the intensity of light falling on the sensor decreases and the headlights switch back to their original mode. There might be a question of other sources of light in the road like sign boards, sources of light in the road like sign boards, as the source and the placement of the device is highly directional, it is not affected by any other light sources which might be present in the vicinity. Moreover, the light from the vehicle's headlamp is of a distinct nature.

VII. CONCLUSION

An automatic headlamp dimmerfor on-coming vehicles had been designed using the DR sensing technique. Thus, the system device automatically switches the headlightto low beam when it senses a vehicle approaching from the opposite sideusing Light Dependent Resistor (LDR) sensor. Glare during driving is a serious problem for drivers and therefore caused by the sudden exposure of our eyes to a very bright light of the headlights of vehicles. This causes a temporary blindness called theTroxle effect. Eventually this has become the major reason for accidents occurring at night and also during bad conditions such as rainy and foggy conditions. The driver should have turned down the bright lights immediately to avoid glare to the other person, however they find it difficult to do. Hence, the idea for the design and development of a prototype circuit called the automatic headlight dimmer. It enables the driver to use high beam light when required and also automatically switches the headlight to low beam when it senses a vehicle approaching from the

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opposite side. Thus, the implementation of this device in every vehicle does not only avoid accidents but also providea safe and a comfortable driving. A server module could be included to this system for receiving and storing headlight rays parameters information in a database application.

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