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Automatic Headlight Intensity Controller

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Abstract: During night travel headlights of vehicles can cause great danger. Most of the drivers use high bright beams during their night drives. This will cause great discomfort for the person travelling from the opposite direction. It will cause a sudden glare for the person travelling from opposite for a short period of time. This is caused due to high intensity of light of the vehicle coming from opposite direction. Nowadays many accidents at night are caused due to high intensity of headlight from the opposite vehicles. So many health issues like eye problems, headaches, mental stress etc are caused due to high headlight intensity. In order to reduce this we are introducing automatic headlight intensity control system. Our system automatically lower down the headlight when a vehicle is coming opposite if our headlight intensity is high. All the other times the headlight of the vehicle will be kept high. We can also manually control the intensity if needed. The sensor used will detect all the light nearby including the light from the stores, streetlight etc and dims the intensity of headlight accordingly. Continuous power supply from the battery is needed for the sensory circuits. It is high time to introduce this type of system due to increasing rate of accidents in India. It is also a cost effective solution for the problem of night time accidents. It will increase the safety for the drivers and pedestrians.

Keyword: Sketching

- 1) Head light intensity
- 2) Automatic control
- 3) Arduino
- 4) PIR sensor
- 5) LDR module

I. INTRODUCTION

In today's busy world, the rate of accidents are tremendously increasing. The studies have found that 40% of accidents happen during night and the major reason for the occurrence of accidents that happen during night is the glare that results from the high beam intensity headlight that vehicles put on. The high beam headlight is actually meant for illuminated vision during night rides where there are no other vehicles nearby and the low beams are meant for a clear path any time during night even when there are vehicles around. It is to be followed that whenever you see a vehicle in front, your high beam headlight should be lowered in order to reduce its impact on the driver of opposite vehicle. But people often forget to dim their headlight when a vehicle approaches them. The high beam intensity headlight painfully blinds the driver and creates heavy glare which makes vision impossible. The driver loses his control and results in dreadful accidental situations. This very crucial problem which is one of a major headache to the society can now be avoided by making use of 'Automatic Headlight Intensity Controller'. In this way the sensor in the controller circuit senses the presence of any intensity of light and turns the high intensity headlight automatically to low intensity beam.

The circuit consists of a package of programmable Arduino, a PIR Sensor, power source, LDR and the supporting headlight. PIR which is typically a motion sensor senses the motion of vehicles that passes from at a distance of 50meters. The Arduino is programmed in such a way that whenever it encounters the presence of light, the connected LDR senses this illumination and reduces the high beam to low beam when it is at the high beam. The program is made to make the default setting of headlight as high beam. The sensor can also detect the presence of light of the street light and also the light from the nearby shops which make it function the same way if the intensity is greater than 1 candela. Whenever the road is free of light the sensor senses no light and thus the headlight remains in high beam state. Whenever there encounters any presence of light above 1 candela of light intensity on the sensor the resistance of LDR decreases which eventually decreases the voltage across LDR. This results in lowering of light intensity of the headlight to low beam. When this technology is installed in all the vehicles, it is sure that this can bring a novel change to the society. That is, even if the driver couldn't change the beam intensity as and when required, the sensor in the vehicle automatically understands when it is required to change the intensity and alters accordingly. In this way whenever two vehicle approaches to each other, the beam intensity of both the vehicles becomes dim simultaneously which helps for better driving anytime. We already know how much disturbing is the high beam headlight intensity of an opposite vehicle. If we see an opposite vehicle with high beam headlight it does not mean that we are free to do that as well. If you think someone else's headlight is hurting

you make sure that you don't hurt someone the same way. And if you think it is a must that everyone should follow this pattern of turning the headlight low whenever a vehicle comes in front, then make sure that you upgrade this technology to your vehicle. If you want to make a change, first be the change.

II. LITERATURE REVIEW

Now a days many project are working on this relevant topic, that is Automatic headlight intensity control. If we are to note some of them there is a Automatic high beam controller which employs a transmitting and receiving circuit separately. This circuit uses ldr and IR-Rx and IR-Tx[1]. The switching of beams is made possible by a relay switch. Here the major disadvantage is there should be receiver and transmitter on every device. But in this project only a simple circuit is necessary for transmission and detection.

Again there is another system called automatic high beam control system. It mainly uses actuators microcontrollers and sensors[3]. They also use phototransistors. Using this they control the high beam according to the visual range of drivers. Also decrease the beam when a vehicle is coming in opposite direction. When the opposite vehicle passes over low beam will be switched back to high beam. In another system called automatic headlight beam controller ldr and adc is used. The adc signals the microcontroller and it reduce the intensity of light[2]. Here also switching is made by relay switches. In this project called Automatic headlight intensity controller, there is no need of using complex circuits. The main program is in the arduino. Extra we only need a battery and two sensors for detection. It is high time to bring out something like this as the accident rate in India is tremendously increasing today and the main reason for the night accidents is the very disturbing glare that appears due to the high beam intensity. As mentioned earlier this is a very economical way which every one can depend on. From other projects we mainly tried to simplify the circuit. Our project is entitled as 'Automatic Headlight Intensity Controller' which helps to automatically control the intensity of headlight of the vehicles when light falls on the system circuit which consists of a sensitive LDR, a PIR sensor to sense the motion of the approaching hindrance, ARDUINO, power source and the headlight. As per the circuit design when a light intensity greater than 1 candela at a distance of 50 meters falls on the LDR the default headlight beam which is high turns low. Several authors and developers have worked on various vehicle headlight technologies many of which are restricted onto certain theories. A paper of Technical Research Organisation India have submitted a paper titled 'Intelligent Headlight Controller for Vehicles' which controls the headlight intensity only if an opposite vehicle approaches with a high intensity headlight. But in our project we also look for the power saved along with the safety.

III. RESULT AND DISCUSSIONS

Automatic Head light Intensity Controller can reduce the high beam to a low beam whenever it senses a high beam. So whenever two vehicles with high beams come opposite to each other, they will reduce their high beams when they are close. And after passing each other low beams will be changed to high beams. This technique also employs when there is a streetlight or any other high beams. The circuit is made mainly using arduino, pir sensor, and ldr module. This is highly an economical way to reduce road accidents at night. Since the road accidents at night in our country are increasing day by day.

IV. SYSTEM DESIGN

- 1) *Power Supply*: This block provides the voltage needed for the comparison, processing, switching and the output.
- 2) *Sensor*: The sensor is a component that responds to light, in this case a light dependent resistor. It senses both the presence and absence of light which changes the values of its resistance
- 3) *Switch*: this switch is for the dim light to be on always
- 4) *Output*: The dim light will be always on. An LDR is fixed in the front of the headlight so when a high intensity light comes and hit on the LDR the high intensity light on the car will get turned off and the dim light will be on

The prototype was carefully implemented on the structure. Components were carefully selected with the intended purpose in mind. It is necessary to note that for the full eradication of the hard effect on night driving, the dimmer is to be integrated on all vehicles so that the dimming benefits all road users at the same time. Also, the design is a prototype, therefore some parameters such as size and light intensities are considered at a reduced scale.

- a) *The Light Dependent Resistor*: Light Dependent Resistor (LDR) is a type of semiconductor and its conductivity changes with proportional change in the intensity of light. A light dependent resistor (LDR) is a resistor whose resistance decreases with increasing incident light intensity; thus, it exhibits photoconductivity. Light Dependent Resistors are very useful especially in light/dark sensor circuits. A Light Dependent Resistor is made of a high resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron and its hole partner conduct electricity, thereby lowering resistance. The light sensitive part of the LDR is a wavy track of Cadmium Sulphide

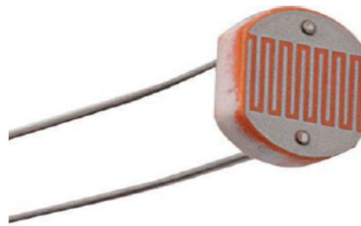


Fig.4.1

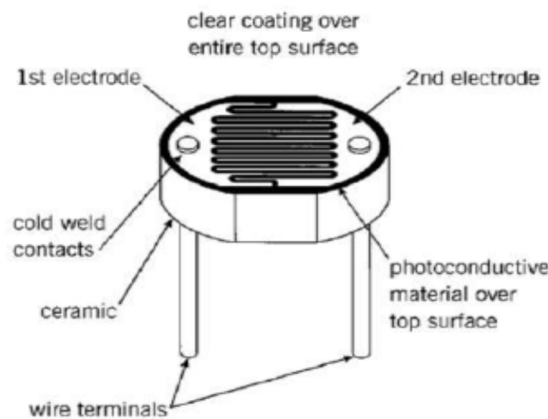


Fig.4.2

b) *Resistors R1 and R2:* The resistors combined with another resistor of same value is fixed to the dimmed lights

LED's The LED's used in the prototype represent the actual high and low beams. LED 1 (The white LED) represents the high beam light and is connected to Normally Closed (NC) terminal to the LDR. When the switch is closed in the dark, the high resistance of the Light Dependent Resistor prevents current from going through the LDR so the high beam LED displays and stays on. On the other hand, LED 2 (Red LED) is the low beam light. It is connected to the high value resistor so it stays dimmed itself.

The entire operation of the circuit can be integrated and summarized below: The LDR is connected to the high beam light and high value resistor is connected to another two led which will be always dimmed and on. When a high intensity beam of light comes and hits on the LDR the high intensity light of both the cars will be turned on like a switch automatically. The low beam which is on will now come to action. After passing of the car the high intensity light will get on. This is the summarized principle of the product. The below shown is the image where the LDR is fixed. (the red dot is the place where the LDR is fixed) The high beam of light will come and hit on the bonnet of the car so the LDR will do its work and the function repeats simultaneously.

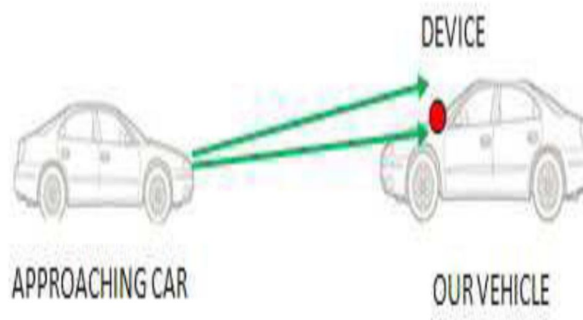


Fig.4.3



V. CONCLUSION AND FUTURE SCOPE

This project of Automatic Headlight Intensity Controller helps to automatically control the intensity of the headlight of vehicles when it encounters the presence of light. This project has a wide scope for development as the occurrence of accidents during night is one of a critical situation that world is facing. The light source can be of the opposite vehicle, nearby shops, street lights with an intensity greater than 1 candela within a distance of 50meters infront the respective vehicle. Whenever the light source falls on the high sensitive LDR, its resistivity decreases and correspondingly the voltage across LDR also decreases and eventually the beam intensity reduces. The vehicle during night moves with high intensity headlight by default. Presence of light automatically alters the high beam to low beam. This upgrade in all vehicles can create a huge difference in the increasing night accidents that we come across daily. It is high time that we have to develop something for this particular social cause which can save a lot of lives as the accident rate is tremendously increasing and the reason for the accidents is the disturbing glarethat the opposite vehicles puton. Also the project make sure that people save their time and energy in its use.

The future developments that can be brought to this project is a manual control mechanism along with the automation. It is because , once when the system is automated it is not possible to control the beam intensity manually even if we wanted to alter it. There can be instances where we want a high beam even if there is a light source infront. In such cases nothing can help if the system works automatically alone.

If you think you are disturbed by someone else's high beam, never make it a point to disturb someone else by your high beam. Lets rethink for a better change.

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