Automatic Head Light Intensity Control ForVehicles To Avoid Accidents

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***Abstract*— As a result, collisions and accidents are prevented. The goal of the research is to create an effective automatic headlamp intensity control system based on LDR that might be used to avoid car accidents. The brightness of a car's headlights at night is a very serious issue. Most people who drive at night do it while using their high beam. To avoid repeat instances, this is inconvenient for the individual traveling in the other way.The proposed system may be shown using two cars, where the high beam of one car can be decreadwith help from a vehicle moving in the other direction, and vice versa, using an LDR sensor., significantly reducing the likelihood of accidents. An automatic headlamp intensity management system is being developed. Dimming the headlighto keep the light out. This beam induces temporary blindness, which leads to nighttime traffic accidents. When a vehicle approaches, the high beam shifts to the low beam, which reduces the glare impactThis concept eliminates the need for the driver to manually switch, which is rarely done.**

I. INTRODUCTION

every day, additional autos are added to the road system. As a result, the safety of the driver and passengers is of the highest concern to car manufacturers. The majority of businesses use either high or low beam headlights. When driving at night, drivers use high lights, which glares cars approaching from the side. Furthermore, this problem occurs when driving around sharp turns, which decreases the vision of the road for cars approaching from the side. These flaws make drivers heading in the opposite direction momentarily night blind for a brief period of time. As a result, more accidents have occurred in the last 10 years. Despite the fact that there are much fewer cars on the road at night than during the day, Nighttime accidents account for 33% of all accidents, with a higher risk of deaths. According to one study, the potential threat of a traffic collision doubles at night compared to during the day.

II. LITERATURE SURVEY

Many criteria, as stated by **Victor Nutt[1]**, are taken into account while analysing automotive transportation in order to promote safety. Temporary blindness caused by increased illumination intensity is one of the most major issues for night-time transport. While increased lamp intensity improves vision, it has the opposite effect on incoming vehicles.When both drivers use a greater lighting intensity level, The situation has worsened. Furthermore, higher speeds caused by lesstraffic at night worsen the severity of collisions. To avoid accidents caused by driver inattention. Low latency allows for rapid change of lighting intensity, reducing brief blindness.

Khavare Vinayak Vithal, Akshay Ganesh Vithalkar,[2]
While single phototransistor has a field of vision that is normal to the road surface and the other has a field of view that is in front of the cars,allowing for both automated headlamp switching and beam modulation. A motor vehicle automatic headlight beam control system is what this is.The purpose of this article is to provide an overview of the effort that has gone into designing the AHBCS.

Tejas Vijay Narkar [3]suggested using this strategy. When driving at night in urban areas, where there is light everywhere, the device's operation may be impacted. At that point, the mode may be changed to manual mode to prevent headlight flickering. When both cars are equipped with theAutomatic Dipper," the headlight beams of both cars may be effectively dipped." then the headlights of the two cars effectively overlap.

AslamMusthafa R (2017)[4]created a controller for the automated headlight beam. It will automatically adjust from high beam to low beam and decrease glare when it detects the amount of light coming from opposing cars.

AbdulKader Riyaz .M (2017)[4]presented an Arduino microcontroller-based autonomous street lighting system based on graphene-coated LEDs. The creator of this introduced a GaN-based LED that serves as a heat sink. The Arduino microcontroller was employed.

Williams, E.A. (2016) [5]suggested an implementation plan.of an automated headlight dimmer for automobiles with an LDR sensor (light dependent resistor).The apparatus canautomatically dim the headlight when the light-dependent resistor detects it **[5].Mali P.S. (2016)** talks about how automated headlight dimmers react to approaching automobiles. This author utilises LDR to detect if the light is coming from a low- or high-beam. The circuits will notify the LDR when the light switches from higher to dipping mode.

III.SOLUTION STRATERGY

The majority of nighttime accidents happen as a result of excessive light hitting the car. It produces glare and troxler fading, which result in accidents. The amount of light hitting the other car should automatically dim in order to solve this issue. The light may be manually adjusted for intensity, however in some circumstances this can be challenging. This paper describes the automated lighting adjustment that is required to solve this issue. The quantity of light falling on the car is measured using LDR. The microprocessor lowers the amount of light intensity in the car when the LDR detects a significant quantity of intensity of light falling on it. This provides a clear picture for the motorists. As a consequence, it prevents collisions and accidents from occurring.

IV.DETAILED DESIGN

The chapter provides the project's design specs, block diagram, circuit diagram, and list of components.

4.1 BLOCK DIAGRAM

The block diagram of the project and the design aspect of separate modules are discussed in this chapter. figure 4.1 shows a block diagram:

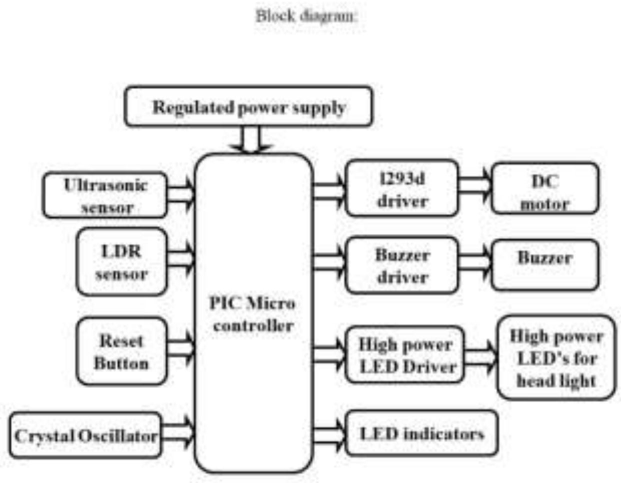

figure 4.1 block diagram

A microcontroller is the component that controls the whole system for the vehicle. The microcontroller is interfaced with an LDR sensor module, a high power LED, and an ultrasonic sensor. Headlight intensity falls on the LDR sensor when two cars are in opposition, which causes the intensity to be automatically decreased. Due to the great intensity of the cars' headlights and the ultrasonic sensor's ability to identify any obstacles, this method minimises accidents. Through a buzzer, the microcontroller will issue auditory notifications.

ULTRA SONIC SENSOR

Figure 4.4ultra sonic sensor

Similar to radar or sonar, which determine a target's characteristics by analysing the echoes from radio or sound waves, ultrasonic sensors (sometimes known as transceivers when they both send and receive) operate on the same principles.High frequency sound waves are produced by ultrasonic sensors, and they analyse the echo that is returned to them. Sensors figure out how far away an item is from them by measuring the duration between transmitting a signal and getting an echo. Speed and direction may be measured with this technique.

LDR

Photoresistors, also known as light dependent resistors (LDR), are light sensitive devices that are commonly used to detect the presence or absence of light, as well as to measure the intensity of light. Their resistance is quite high in the dark, often reaching 1 M, but when exposed to light, the resistance reduces rapidly, perhaps to a few ohms, depending on the light intensity. LDRs are nonlinear devices with a sensitivity that changes with the wavelength of the light applied. They are utilized in a variety of applications, but other devices, such as photodiodes and phototransistors, are frequently used to detect light. Some nations have outlawed lead or cadmium-based LDRs due to environmental concerns.

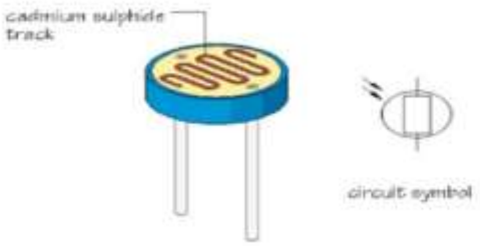

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Figure 4.5 Light dependent resistor

Resistor types include LDRs. This resistor's resistance fluctuates according on the amount of light that hits it.This means that if light shines on LDR, resistance will rise and vice versa.To adjust the light intensity in this project, we are utilising an LDR. During the day, light strikes the LDR, increasing resistance, which prevents current flow in the circuit.Since there is no light shining on the LDR at night, its resistance is reduced and we may regulate the amount of current flowing through the circuit.

BUZZER

An auditory signalling device, such as a buzzer or beeper, might be mechanical, electromechanical, or electronic. There are two ways to operate a buzzer.

1.A piezoelectric buzzer producessound thanks to the piezoelectric action.features of a buzzer circuit:

1. audio quality ---------------70-95 dB
2. Current consumption: 35 to 60 ma

Figure 4.7 Buzzer

PIC MICRO CONTROLLER(16F72)

Figure 4.8 micro controller

This PIC® architecture-based CMOS FLASH-based 8-bit microcontroller is upward compatible with the PIC16C5X, PIC12CXXX, and PIC16C7X devices and is powerful (200 millisecond instruction execution) yet simple toprogramme (just 35 single word instructions). The PIC16F72 includes a synchronous serial interface that may be configured as either a 3-wire Serial Peripheral Interface (SPITM) bus or a 2-wire Inter-Integrated Circuit (I2CTM) bus, 5 channels of 8-bit Analog-to-Digital (A/D) converter, 2 extra timers, and capture/compare/PWM functionality. These attributes make it perfect for higher level A/D applications in the automotive,industrial,appliance, and consumer markets

DC MOTAR DRIVEER

Figure 4.10 DC motar driver

An electric motor that runs on direct current (DC) is referred to as a DC motor.9-15V DC is the motor supply.By switching the supply polarities, a DC motor may be made to operate in both directions.
Microcontroller is unable to drive the motor when it is linked directly to it and cannot operate the motor in both directions.
In order to connect the motor to the microcontroller, a motor driver (H-bridge IC) is utilised.L293D (2 H-bridges) is the motor driver utilised in the project.

L293D MOTAR DRIVER

Figure 4.L293D Motar driver

A well-liked 16-Pin motor driver IC is the L293D. It is mostly used to power motors, as the name would imply. Two DC motors may be operated simultaneously by a single L293D IC, and their individual directions can be separately regulated.

RESET BUTTON

Figure 4.12 Reset Button

A reset function returns the microcontroller to its 'known' state. This effectively implies that microcontrollers may perform poorly under certain adverse settings. It must be reset in order to continue working properly. The digital input is shorted to ground when a switch situated between it and ground is pushed. As a result, the voltage at the input is high while the switch is open and low when it is closed..

LEDS

To adjust the intensity in this project, we are utilising 5v DC-operated LED headlights.

The micro controller is connected to the LED lights, and it is the controller's job to regulate the light intensity according to the LDR input.

CRYSTAL OSCILLATOR

An electrical circuit that generates an oscillating signal is called an oscillator.
PIC Microcontrollers can operate at a maximum frequency of 20 MHz.
Because crystal oscillators are more stable to temperature than other oscillators, they are employed in this project.

CIRCUIT DIAGRAM

This device's design was created on a vero board with the following measurements: 310.5 mm x 160 mm x 2 mm. Strip board is another name for vero. Wide parallel strips of copper cladding extending in one direction all the way across one side of the board, along with a regular rectangular grid of holes measuring 0.1 inches and 2.54 mm, characterise this popular form of electronics prototype board. In order to separate the strips into several electrical nodes while utilising the board, breaks are formed in the tracks, often around holes.

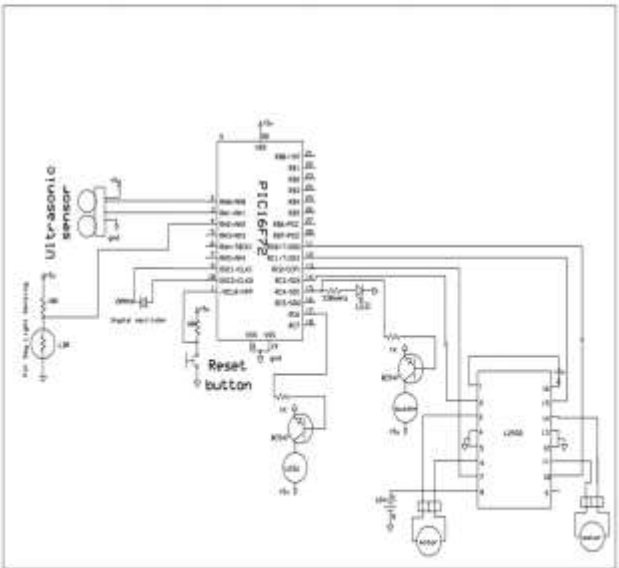

Figure 4.13 operational circuit

The interface section of each component with the micro controller is explained by the schematic diagram above, which includes an LDR, an ultrasonic sensor, a buzzer, a high-power LED, and a microcontroller-based automatic vehicle headlight intensity control and obstacle alerting system. A crystal oscillator is linked to the 9th and 10th pins of the microcontroller, along with a regulated power supply and LEDs that are connected through resistors to the microcontroller.

The operation needs a source of 12 V DC supply, which is obtained from a battery. In a real-world setting, the This may be replaced with the car's own battery pack. The headlights, LDR, and transistor are all powered by the same DC source.

V. RESULTS

The "Microcontroller Based Automatic Vehicle Head Light Intensity Control and Obstacle Alerting System" project explains the interfacing section of each component with the microcontroller and was designed as an automatic head light intensity control for vehicles to avoid accidents.A microcontroller is the component that controls the whole system for the vehicle. The microcontroller is interfaced with an LDR sensor module, a high power LED, and an ultrasonic sensor. Headlight intensity falls on the LDR sensor when two cars are in opposition, which causes the intensity to be automatically decreased. Due to the high-intensity headlights of the cars and the ultrasonic sensor's ability to identify any obstacles, this technology eliminates accidents.The microprocessor will issue the audio warningsthourgh the buzzer.

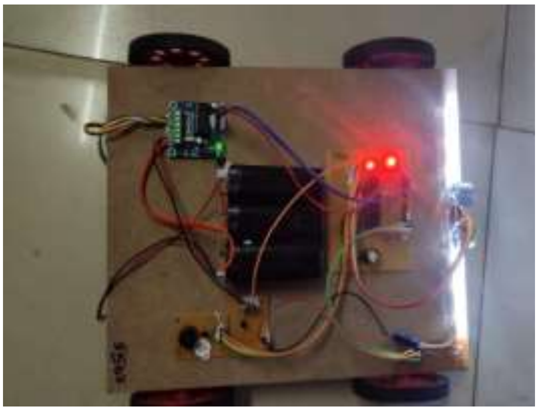

Figure 5.1 Interior circuit of vehicle

CONCLUSION

Drivers have a severe issue with glare when operating a vehicle. This happens when our eyes are suddenly exposed to a strong light, in this example the headlights of passing cars. The Troxler effect is what results from this momentary blindness. Over time, this turns out to be the primary cause of accidents at night. Actually, the driver ought to instantly dim the bright lights to prevent glare on the other passenger, but this is not occurring. Thus, the automated headlight dimmer prototype circuit design and development concept was born. The ability to employ high beams of light is provided to the driver. However, when it detects a car coming from the other side, it Lowers the headlights instantly. As a result, installing this device in every automobile in the future will not only avoid accidents, but would also ensure that driving is safe and fun.

FUTURE SCOPE

The use of headlights in automobiles has necessitated a trade-off between reducing glare and providing just enough light for drivers to see the road ahead. This strategy, by removing human error from the equation, allows the driver to focus on driving safely rather than tinkering with the light settings. Technology has altered headlights, interior surfaces, and the highway environment to lessen glare either directly or indirectly for drivers. Future auto cars will incorporate this project's concept, which will undoubtedly be widely and greatly embraced.

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