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Automated Brightness in Automobiles

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***Abstract*: This project describes an IoT based wireless sensor automated network for headlamp control. The wireless sensor network automatically monitors the environmental brightness and initiates the control measures to be taken. The controller checks the environmental brightness and if the value exceeds desired intensity level a message will be sent. Then the headlamp goes to minimal condition. With the help of this system we can save enormous amount of energy that can be used for other purposes.**

***Keywords*: IoT, Wireless sensor network, Controller, Environmental brightness.**

1. Introduction

Road accidents are increasing and the rate is alarming in India. The vision and the traffic in the night need to be further augmented with facilities such that the vehicles provide illumination in a way that it does not blind the driver of the oncoming vehicle. The Union Ministry of Road transport and Highways had made it compulsory that the automobile should be equipped with Automatic Headlamp ON (AHO). According to Union Ministry the headlamp control of automobile is not fixed. So, headlight is always in ON state and so it consumes more battery power. In India the vehicle is mostly idle when stuck in traffic. As cities with dense traffic, AHO or less needed over there, to reduce over heating conditions in batteries and to save power.

A. Existing System

In both BS IV and BS VI 'LED variant' headlamps are fixed with only two options – DIM / DIP where there is no option for switch OFF the headlamp. On before BS IV and early period of BS IV the vehicles came up with 'Halogen Lights' where the OFF option is provided but the energy consumption and intensity level are not up to the expectation.

B. Problem Definition and Motivation

In two wheelers most batteries have an expected life span of two years. To this case if we add up day light system (AHO), the battery consumption will be terribly high and after the batter die it pollute the surroundings enormously.

2. Related Works

The controller of intensity level in head lights had been introduced by many research persons as when we introduce a strong visible light then the one of the LED is moved to OFF stage but when the vehicle is in traffic and engine is in ON it revert back to normal glow and still there is a consumption of energy [1]. An intelligent headlight control system which aims to automatically control a vehicle's beam state during a night-time drive is presented in this paper. Two machine learning-based approaches, namely, SVM and AdaBoost, are proposed to accomplish such a task. But they not proposed the system for day time hence again there is a wastage of battery [2]. Here they used a digital camera to capture the opposite car light intensity level and they introduced algorithms to automate the headlamp it is a tedious process [3]. when we introduce a strong visible light then the one of the LED is moved to OFF stage but another LED glow with full power consumption so still there is a consumption of energy [4]. Here The STC12C5A60S2 single chip computer acts as the carrier and headlights intelligent control system based on it the C51 single chip microcomputer is used in the design. Instead we can use Arduino UNO WIFI Module with ATMEGA 328P microchip [5]. In this module the decreased the brightness of the headlamp partially as on either side of head lamp where the strong light is introduced from opposite then that headlamp get dimmed [6].

3. Proposed System

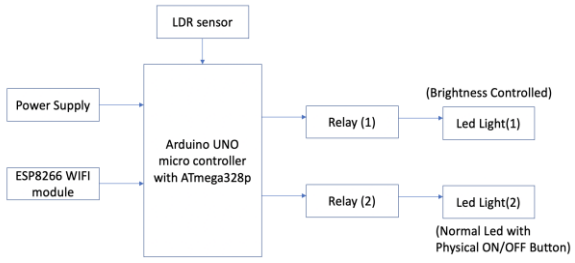

Fig. 1. Hardware design

When enough environmental light is available, there is no need of headlight with such high intensity. To increase the effectiveness of the controller we propose an Automated Brightness in Automobiles which provides illumination according to the environmental lighting conditions. LDR is known as light dependent resistor, its resistance varies according to the intensity of light falling on it. Arduino UNO microcontroller is used with the WIFI module ESP8266 and with the microcontroller ATmega328P. When we introduce a strong light on the surface of LDR, the intensity information passes to the microcontroller. Microcontroller compares the intensity of incoming light with the desired intensity value.

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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.

A. Explanation

1) Arduino UNO

The Arduino UNO is connected with the power supply using power jack it consumes (7V – 12V). With this other module like LDR sensor, Microchip ATmega328P microcontroller, ESP8266 WIFI module and controller are connected.

2) ATmega328p

It is connected with Arduino board which is low power CMOS 8-bit microcontroller.

3) LDR sensor

Light Dependent Resistor is a light sensitive device it is used to indicate the presence and absence of light.

4) ESP8266 Wi-Fi module

It is a low-cost microchip with TCP/IP stack. This module allows the microcontroller to connect a WIFI network and make simple TCP/IP connection using Hayes-style commands.

5) Relay

Relay are the switches which aim at closing and opening the circuits electrically and electromechanically.

B. Working

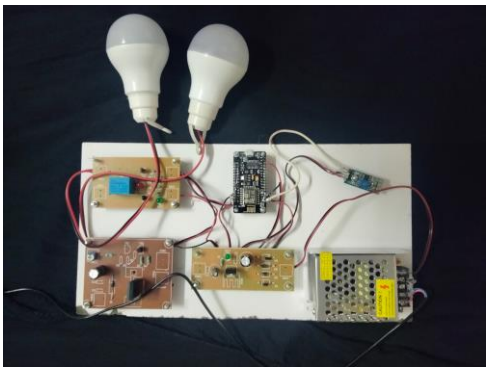

Fig. 2. Hardware setup

Our Vehicle is fixed with hardware device which we made for automated headlamp control purpose. When we introduce the bright light into the headlamp it is sensed by LDR (Light Dependent Resistor) sensor and the light intensity level is communicated to the controller. The controller compares the incoming intensity level with the desired intensity level which is pre-installed within the hardware device.

After comparing the intensity level, if the incoming intensity level is less than the desired intensity level, then the headlight brightness is increased and vice versa.

In case if a person not satisfied with the automated brightness during his/her driving then they can adjust their headlight brightness manually through Auto/Manual Control. So to adjust the brightness we have created a software system.

Here we introduced a software for both two wheelers and four wheelers to increase or decrease the brightness of the headlamp and we have an add-on a pass light as an extra feature. It can be turned ON/OFF physically using the software

When the software is connected through the WIFI module to the hardware device then he/she can see the brightness adjustment tab, pass light ON/OFF switch and they can have the control over the headlamp system.

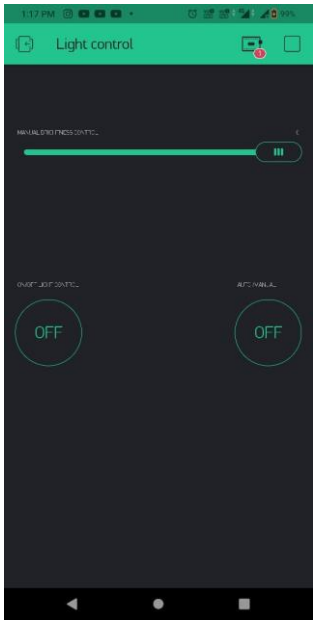

Fig. 3. Light control

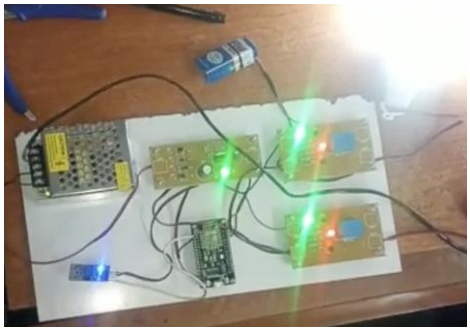

Fig. 4. Working

If the software is not connected to the hardware though the WIFI module then he/she cannot see the intensity, brightness level and can't adjust the settings. The Hardware device works on automated mode.

C. Advantages

- Battery Ageing is reduced.
- E – Waste are reduced.
- User Friendly.
- More mileage in E-vehicles.
- Device is cost efficient.
- Easy Installation.

D. Disadvantages

- Network Connection is needed.
- Basic Knowledge is must.

E. Applications

- Later BS IV, BS VI and all kind of Electric Vehicles can support this device.

- It can be installed in both Bikes and Cars.

4. Result

'Automated Brightness in Automobiles' this device is packed up with Arduino UNO, WIFI module, bundled up with LDR sensor and 2 LED's. Thus, the incoming intensity level is sensed by LDR sensor and communicated with the controller. The headlamp brightness is adjusted according to the opposite light intensity. A software application is also placed for the knowledge of driver about the current intensity level, brightness level, brightness control and for pass light control.

5. Conclusion

This paper describes an IoT based automated controlled headlamp system. This system is compact in nature, low cost and low power consuming operation. Hence, using this methodology in vehicles we can save the battery usage and can decrease the E-waste in little amount.

6. Future Scope

The same project idea can be done with Raspberry Pi board which can make this project even compact than now. May be in future this project idea can also be implemented for Heavy Motor Vehicles (HMV). In future the software can also be released for iOS variant also.

References

[1] T. Keser, K. Nenadic and I. Petrovic, "Analysis of Economic and Ecologic Aspect of Daytime Running Headlights Law", 26th Conference on Transportation Systems, Automation in Transportation 2006, KoREMA, Split, Croatia, 2006, pp. 82-85.

[2] Y. Li, N. Haas and S. Pankanti, "Intelligent headlight control using learning-based approaches," 2011 IEEE Intelligent Vehicles Symposium (IV), Baden-Baden, Germany, 2011, pp. 722-727.

[3] B. Jaint, S. Arora, S. Saxena, C. Singh and S. Indu, "Automatic dipper system using camera in vehicles," 2017 IEEE Region 10 Symposium (TENSYMP), Cochin, India, 2017, pp. 1-5.

[4] Achyuth Varma, Sravan Kumar, R. Sai Varma, M. Sukumar, P Rajesh, "Intelligent Head Light Controller for Vehicles," 2018.

[5] B. Zheng, X. He and J. Zhang, "Intelligent Control System Design of Automobile Headlights," 2019 IEEE 4th International Conference on Cloud Computing and Big Data Analysis (ICCCBDA), Chengdu, China, 2019, pp. 373-377.

[6] V. M. Mulay, J. Sarkar, A. Jadhav and S. Bhure, "Provident Headlamps Technology for Electric Vehicles," 2020 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2020, pp. 1-5.