Light Beam Synchronising System For Automobiles

Meeradevi T, SharavanaRaju K.M, Raja Kavya S, Prashanth S Navaneetha Kumar S

Abstract: Automobiles has been become the basic necessities of day-to-day life.The statistics says that about 45% of the accidents are occurred due to the light beam, there exists a problem of travelling during the night time. In the existing system, the high light beam will automatically turn ON whenever the surrounding light conditions are found to be dark and vice versa.Also the brightness of the light beam is varied by the drivers based on the presence and absence of opposite vehicle. In our daily life most of the drivers are not changing the intensity of the headlight even though there is an opposite vehicle. It causes irritation to the driver while driving in night time. To overcome this problem this paper presents a system in which the light beam is synchronized from high beam to low beam if the intensity of the opposite head light is found to be high. After crossing the vehicle, the headlight will automatically turned to high beam .An additional feature of identifying the amount of CO2 present inside the vehicle is also proposed in this paper. CO2 measurement is done by a gas sensor which is interfaced with the microcontroller. On reaching the threshold analog value of the gas sensor after which the individual feels uncomfortable, the automobile windows are opened automatically for ventilation and avoiding suffocation

Index Terms: Accidents, CO2 leakage, Head lamp, Light beams, night vision.

1. INTRODUCTION

Most of the industrial automation and control systems are based on semiconductor technology, embedded system and computer science.Embedded system play a major role in most of the applications as they can be programmed and expanded easily. The fields in which the embedded system plays a major role are automotive, industrial, medical, military and commercial applications.InIndia,night driving has been the most life threatening thing for most of the drivers. According to the online survey conducted by google science fair, it is observed that the oncoming vehicle was the biggest concern for safety on road during night. It is followed by pedestrians crossing erratically and potholes on the road with the percentage of 28%, 14.8% respectively. The sudden intensity of light from the headlight of the opposite vehicle blinds a driver or few moments which leads to most of accidents. There were nearly 5000 registered accident case in this state. Drivers are finding it difficult to travel in night as the headlight beam causes a short time blindness and results in accidents. The main objective of this paper is to present a system to synchronize the light beam automatically from high to low whenever it is needed inorder to avoid the accidents. Nagalakhmi T S et al,. (2016) proposed a system tomonitor the vehicles.It aims at noticing the activity of the driver and to know the status of the sensor in the vehicle and the owner of the vehicle. It has the facility to stop the vehicle in case of anything goes wrong by sending the command as STOP which helps the motor to turn off.The vehicle cannot be started until the owner sent an authentication command.This system is constructed by using Raspberry Pi as master controller and Arduino as slave. Hong Cheng et al,.(2007) and his system discussed the analysis of Road situation in Interactive Intelligent Driver Assistance and Safety Warning (I2DASW) system which helps in estimating and predicting the exact location of the different obstacles faced on-road.Since Real-time processing produces incomplete results,there occurs a difficulty in detection of technologies.

- *Meeradevi T, SharavanaRaju K.M, Raja Kavya S, Prashanth S Navaneetha Kumar S*
- *Kongu Engineering College, Erode, Jazan University, Jazan, Saudi Arabia*

This paper discussed and proposed various frameworks algorithms in analyzing the road situation depending on the handling of drivers.First,the development in real time road situation were analysed in the view of research.Second the analysis of road situation is done by considering a sensor which provides processed data on drivers,vehicles and traffic environment.Finally the information on the sensor are processed by using lidar camera and a radar by using the framework and algorithm. The sensors are interacted by using decentralized track-to-track fusion approach.Thecluster data processed through lidar are classified into static and moving objects to decrease the impact that occur due to the shape and appearance. Future collisions are assessed by manipulation of local tracks of moving obstacles using extended Kalman filter, maximum likelihood estimation to fuse distributed local tracks into global tracks, and finally, computation of future collision distribution from the global tracks. S.P. Bhumkar et al,. (2012) proposed a system for sensing and observing fatigue levels of driver [2]. This system uses ARM7for its implementation. This paper, describes a real-time online safety prototype whichwill take care of vehicle speed under driver fatigue. The system consists ofgas sensor, eye blink sensor, alcohol and fuel sensor, impact sensor, software interface with GPS and Google Maps APIs for location. Mahanth Mukeshetal,2008)proposed amonitoring system using mobile phone for automated indoor air quality monitoringwith the concept of IoT. The system periodically checks the indoor environment and controlled using a Smart Phone. The proposed system supervises the CO and CO2 levels in the room and intimate the user if the acceptableboundexceeds. The user can turn on the vent fan from the smart phone, when the tolerable limit exceeds. ShymaShashidharetal.(2014) had given a solution for the car's interior atmosphere which must always be favorable for the passengers to survive. If the passengers inside the car experience any of these situation like pollution entering inside the cabin, tail gate leakage, A/C compartment leakage and for a prolonged time all windows of the car are closed with passenger sin it then it will slowly pave the way to unpleasant situation i.e. hazardous for the passengers to survive and finally even leads to death. All over the world these situations prevailed and are still prevailing. Thus, this proposed embedded solution is an alert system that monitors the toxic gases inside the enclosed space. The oxygen sensor, microcontroller and GSM help to be better monitoring alert system for the safety of the passengers inside the car.

3.PROPOSED WORK

Design of light beam synchronizing system plays a major role in reducing accidents cause by light beam during night travel.Initially the intensity of light is calculated and analysed above which the eye irritation occurs.so as to know the low beam intensity level to be fixed. Secondly the amount of CO2 is analysed to know the level above 2000ppm which becomes harmful .

3.1 LIGHT BEAM SYNCHRONIZATION

LDR is a light controlled variable resistor which is used to find the intensity of the opposite vehicle's light beam and automatically switch to low beam to high beam and vice versa. In the practical setup, the inner circularly arranged led pattern is to indicate the low beam and all the three circular pattern together is to indicate the high beam. It can detect up to 3 meters with a time duration of 1 second. Light beam synchronization block consists of a LDR to provide an input signal and the two light beams to demonstrate the synchronization. Figure 1 gives the block diagram of the light beam synchronization unit.

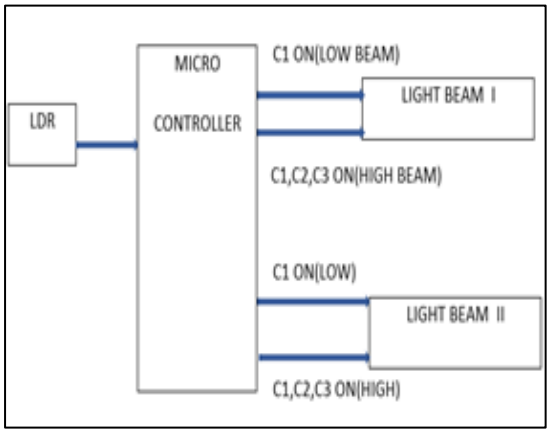

Figure 1 *Light beam synchronization circuit*

Light Beam synchronization circuit will have two PCB boards facing each other which is fixed in the two opposite vehicles with three circularly arranged LED pattern C1, C2, C3 which areconnected to digital port and LDR is connected to analog port of microcontroller. If the LDR signal is high, the circular pattern C1 alone will glow indicating low beam and if the LDR signal is low, the circular pattern C1, C2, C3 will glow indicating high beam. The system is coded by assigning PORTB and PORTE to LCD display, PORT A (AN1) as analog pin for LDR, PORTD as output port. The analog output of the LDR is converted into digital by connecting it to the NPN transistor (BC547) followed by RC0.Based on the input signal of RC0, either the LED connected to RD3 glows (RC0=0) or the LED connected to RD4 glows (RC0=1). The amount of CO2 is calculated by using an MQ9 sensor by assigning PORT A (AN0) as an analog pin using the SCV. The formula used is analog value = (step value*5)/5. When analog value reaches the threshold (200),the motor runs indicating the automobile windows for ventilation. This system is tested in real time condition by fixing it in different kinds of vehicle and its results are tabulated in the Table 1 and it is represented in the graph in Figure 2.

Type Of Vehicle	Distance (Sensed) (M)	Maximum Distance(M)
TWOWHEELER		
TVS	2	3
SCOOTY PEPT	2.5	3
FOUR WHEELER		
MARUTI 800	2.5	3
CELERIO	2.5	3

Table 1*. Real time testing of light beam synchronization system*

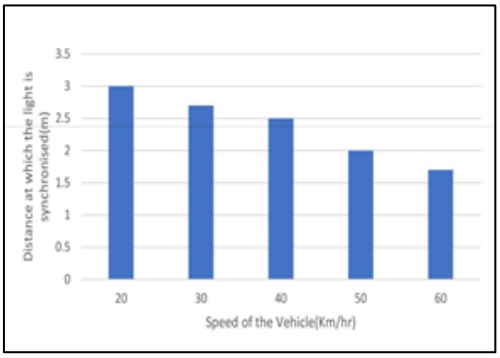

Figure 2*.synchronizing results produced in different speed levels*

Light beam synchronizing system for automobiles deals with the intensity of the light beam of the opposite vehicle and synchronizes to low beam if there is any opposite vehicle.

3.2 CO_2 MEASUREMENT CIRCUIT

The amount of accidents that are occurred due to the excess inhaling of CO2 while driving in vehicle is found to be high. As this paper concentrates on reducing accidents CO2 measurement circuit is used.Figure 3 gives the block diagram of CO2 sensing circuit. CO_2sensor-based circuit will haveMQ9 sensor, LCD and a motor connected to the microcontroller. If the CO_2 gas level reaches 2000ppm, the motor is programmed to run in reverse direction indicating the opening of windows for ventilation and when the CO_2 gas level reaches below 2000 ppm, the motor isprogrammed to run in forward direction indicating the closing of windows.Table 4.shows the value obtained in gas sensor in ppm for different environment

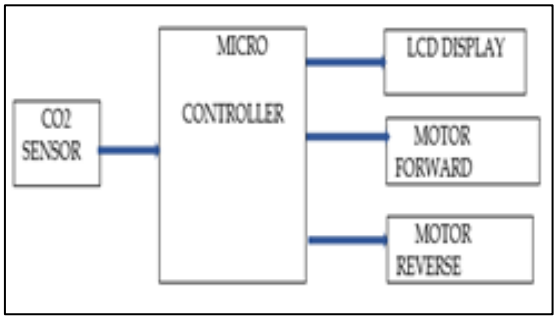

Figure 3 *CO2 sensing circuit*

Environment	CO_2level (Ppm)	State Of Window

Inside The Vehicle	525	CLOSE
Open Environment		
Along The Pathway	2025	OPEN
Park	300	CLOSE
Industrial Area	3000	OPEN

***Table 2**.CO2 value obtained in terms of ppm in different environment*

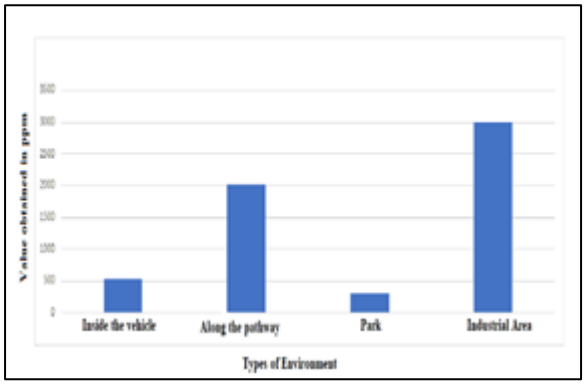

***Figure 4**.CO2 level plotted for different environment*

4.SUMMARY

The light beam synchronizing system for automobiles has been designed to switch the light beam from high to low if the opposite vehicle at night time.Thisis done by interfacing an LDR with PIC16F887A and monitoring the intensity level (high or low) and synchronizing it to low with distance range of 3m and time duration of1second. Additional feature of CO_2 gas detection is done by interfacing an MQ9 sensor. The future enhancement may be made by processing the results in terms of image processing.The project is tested with various real time conditions and the results are discussed in Table 3.

S.NO	Vehicle	Speed	Distance of synchronization (meters)	Minimum distance (meters)	Minimum distance(meters)	Type of plane/ planes
	Four wheelers					
1	Maruti Alto	55	2.5	1.5	3	Plains
2	Volkswagen Polo	60	2.5	1.5	3	Plains
	Two wheelers					
1	Bajaj Pulsar	40	3	1	1	Terrain and plains
2	TVS Apache	45	3	0.5	0.5	Terrain and plains

***Table 3**.Real time sensing depending on speed and types of planes*

5.CONCLUSION:

Since,most of the drivers are not changing their vehicle light beam during night time.Thisautomated light beam synchronization system will provide a suitable solution for the drivers and this will play major role in reducing the number of accidents.Also the automated window movement system learned on the CO2 gas level inside the car will be a solution for better ventilation and avoids suffocation and accidents.

6 REFERENCES

[1] Alferdink, J.W.A.M. (1996), “Traffic safety aspects of high-intensity discharge headlamps” discomfort glare and direction indicator conspicuity. Vision in Vehicles Elsevier Science Publishers: NorthHolland.

[2] S.P. Bhumkar, V.V. Deotare, R.V. Babar (2012), “Accident Avoidance And Detection On Highways”, International Journal of Engineering Trends and Technology, Volume3 Issue2.

[3] Davidson, P.A. (1986), “Inter-relationship between British drivers’ age, visual attributed, and road accident histories”. Vision in Vehicles. Elsevier Science Publishers: NorthHolland.

[4] H. Hogrefe, (2000), “Adaptive front lighting systems for optimum illumination of curved roads”, highway lanes and other driving situations,” SAE 2000- 01-0431. Warrendale, PA:Society of Automotive Engineers.

[5] XuetaoZhang, Junjie Qin, and Huub van de Wetering, (2007), IEEE “Transactions on intelligent transportationsystems” InteractiveRoadSituationAnalysisforDriverAssistance andSafetyWarningSystems: Framework and Algorithms Hong Cheng, Member, IEEE, Nanning Zheng, Fellow,VOL-8.

[6] Jan Fischer-Wolfart, Gereon Meyer, Editors (2013), “Advanced Microsystems forAutomotive Applications 2013 Smart Systems for Safe and Green Vehicles”, Lecture Notes in Mobility, Berlin, Germany.

[7] Nagalaskhmi T S, NirmalaL, AkashSoragaon, (2016). “Raspberry Pi based Embedded System for Vehicle Automation over Internet”, International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 12.

[8] SungminEum and Ho Gi Jung, (2013)“Enhancing light blob detection for intelligent headlight control using lane detection”, IEEE Transactionson Intelligent Transportation Systems, pp.1003-1011.s