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Microcontroller Based Anti Sleep Alarm System

Adnan Ahmad[1]*, Anjali Sharma[2], Astha Singh[3], Sumanta Chatterjee[4], Apurba Paul[5]

[1,2,3,4,5]Dept. of Computer Science JIS College of Engineering, WB, India

[*]*Corresponding Author: adnanahmadroc001@gmail.com, Tel.:7439244341*

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***Abstract* -** With the predictions of the world Health Organization (WHO) that number of deaths due to traffic accidents will be around 2 million in next 15 years. Researchers nowadays are paying more attention in preventing traffic accidents and lower the number of occurred fatalities. The purpose of this work is an attempt to prevent traffic accidents due to fatigue or sleepiness of the driver. In this work we developed a customized goggles, which is microcontroller based anti sleep alert system for the drivers. In this device the inbuilt infrared sensor detect the obstacle and transfer signal to Arduino then Arduino supply signal to buzzer. This device can be used by the physical paralysed person to communicate with others, can be used by the security personnel at night and can also be used by the patient in comma.

***Keywords*:-** Eyesensor, microcontroller, Arduino

I. INTRODUCTION

According to Royal Society for Prevention of Accident (RoSPA), nearly 1.3 million people die in road accident each year worldwide. On an average 3,287 deaths per day, with an additional 20-50 million are injured or disabled due to road accident. Fatigue or dizziness among drivers is a major cause of these road accidents. To reduce the accidents due to fatigue or dizziness, anti sleep alarm helps a lot. There are two types of anti-sleep alarms. There are various types of alarms available in the market. One of the type of alarm is built into the car and uses its sensors, cameras and other high-tech tricks to identify the driver's fatigue and handles the situation accordingly. Another type of alarm fits over the driver's ear and it acts promptly when the driver fall asleep. In this research work we proposed an anti sleep alarm system device which can be easily handled and very affordable in price in comparison to all the available devices in the market. We designed our anti sleep alarm system by using **eye sensor** and **Arduino** (**esp8366**). The eye sensor consists of transmitter and receiver. The transmitter transmits very high amount of IR rays when the eyes are open and in case of closed eyes it will transmit very less in turn. This variation can be converted to voltage using proper interface. The controller can sense the voltage difference and define the condition that if the eyes are open then the buzzer will be inactive and if the eyes are closed then the buzzer will be active. In the rest of the papers we have explained hardware requirements, circuit and pin diagram, working principles, results followed by conclusion and future scope.

II. HARDWARE REQUIREMENTS

There are three main hardware involved in this work.

Infrared LED Sensor: An infrared sensor, Fig 1, is an electronic instrument which is used to sense certain characteristics of its surrounding by either emitting and/or detecting infrared radiation given including experimental design and the technique (s) used along with appropriate statistical methods used clearly along with the year of experimentation (field and laboratory).

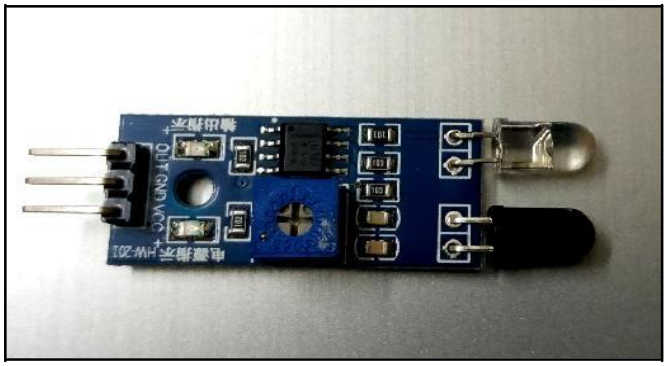

Fig 1: eye sensor

Microcontroller (esp8266) : It, Fig 2, is an open-source platform used for building electronics gadgets. Arduino consists of both physical and programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on the computer, used to write and upload computer code to the physical board.

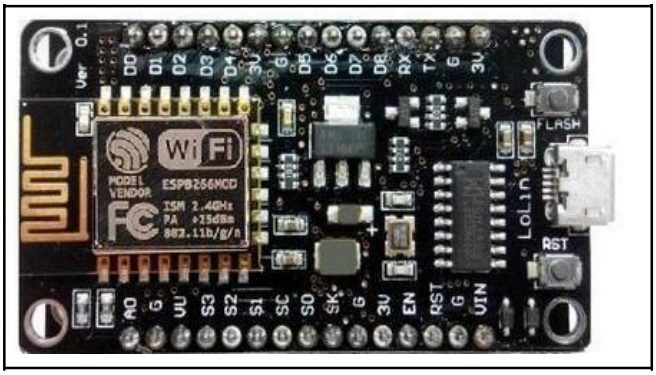

Fig 2: arduino (esp8266)

Goggles: Goggles, Fig 3, platform for setting eye sensor , arduino , and battery.

Fig 3: goggles

III. CIRCUIT DIAGRAM

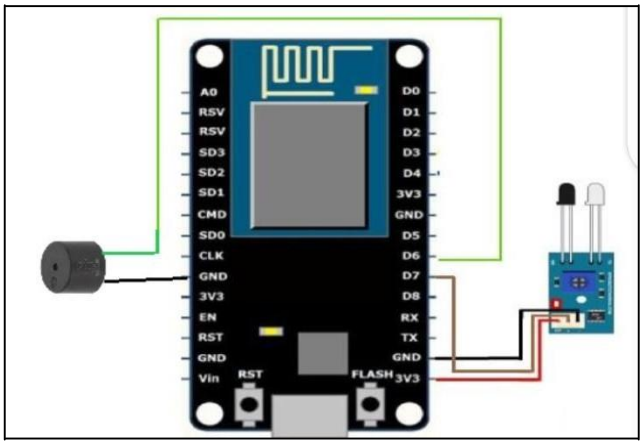

Fig. 4

we connect eye sensor to arduino as follower , the gnd pin of eye sensor connected with gnd pin of arduino , the 5v pin of eye sensor connected with the 3.3 v pin of arduino and the output pin of eye sensor connected to the D7 pin of the arduino and the buzzer pin connection as follow pin 1 of the buzzer connected with gnd pin of the arduino and the pin 2 of the buzzer are connected to the D6 pin of arduino.

IV. PIN DIAGRAM

In the above table we connect vcc pin of eye sensor to the vcc pin of arduino, gnd pin of eye sensor to the gnd pin of arduino, and output pin of eye sensor to the D7 pin of arduino.

Table 1: Connection between eye sensor and Arduino

Eye Sensor	Microcontroller
1. Vcc	1 . Vcc
2. Gnd	2. Gnd
3. Output	3. D 7

In the above table 2, we connect positive pin of the battery to the Vin pin of the arduino and the negative pin of the battery to the gnd pin of the arduino.

Table 2: connection between battery and arduino

Battery	Microcontroller
1.(+) ve	Vin
2. (-) ve	Gnd

In the above table 3, we connect pin 1 of buzzer to Gnd pin of microcontroller and pin 2 to the D6 pin of microcontroller

Table 3: connection between buzzer and arduino

Buzzer	Microcontroller
1.pin 1	Gnd
2.pin 2	D6

V. WORKING PRINCIPLES

The normal blinking rate of eye is 20 closes per minute. It will not have any effect on the performance of the system for normal blinking. When the driver falls asleep, his/her eyes will be closed; hence less light will be reflected from the skin Part of the eye (as it is opaque). This produces maximum output as a voltage. The output is given to micro-controller. The micro-controller will wait for 3 seconds. Then if it finds that the eyes are still closed, micro-controller sounds the buzzer this kit involves measure and controls the eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of the eyes. If the eyes are open then the output of IR receiver is high otherwise the output is low. This way the system can understand that the eyes are closed or not. This output is channelized to the logic circuit to indicate the alarm. Using this device we can even identify whether the driver is unconscious or not. The eye blink ***sensor*** activates the alarm if anybody closes his/her eyes for more than 3 seconds.

VI. RESULTS

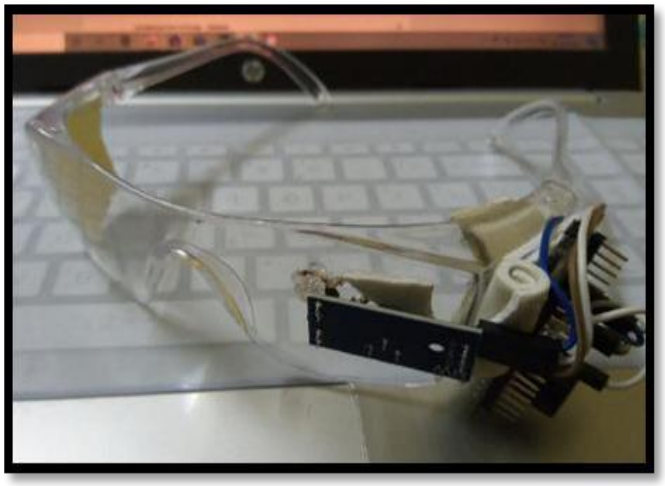

Fig 5: circuit using microcontroller

Fig 6: Eye sensor before reading eye

Fig 7. Eye sensor after reading eye

VII . CONCLUSION AND FUTURE SCOPE

This system is an attempt to help in decreasing and/or prevent traffic accidents that happen due to drivers' drowsiness and fatigues. Using our anti sleep alarm system the drivers will be benefited and be alert while driving with a low price. We believe that our model has lots of societal impact which will reduce the accidents. In future we will use small micro camera which will replace the eye sensor and will incorporate GPS module in the device to track the location of the driver. Since the price is very affordable, we have a plan to marketing it in future.

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Authors Profile

Adnan Ahmad is the second year UG student of computer science engineering from JIS College of engineering, kalian, Nadia, west Bengal, India

ANJALI SHARMA is the second year UG student of computer science engineering from JIS college of engineering, kalian, Nadia, west Bengal, India.

ASTHA SINGH is the second year UG student of computer science engineering from JIS college of engineering, kalyani, nadia , west bengal , India

Sumanta Chatterjee is presently working as an Assistant Professor of JIS College of Engineering, Kalyani, Nadia, West Bengal. He has worked 2 years in the Industry and 7 years in the Academic Sector. He has completed his M.Tech degree in Computer Science and Engineering and B.Tech degree in Information Technology from West Bengal University of Technology. He is recently working on the emerging research field ―E-Commerce‖ and ―Embedded System‖. He has made significant contribution on the research field ―Ecommerce‖ and ―Embedded System‖. He is a member of International Association of Computer Science and Information Technology (IACSIT) and also a member of International Association for Engineers (IAENG).

Apurba Paul, presently working as an Assistant Professor at JIS College of Engineering, Kalyani, Nadia, West Bengal, India. He has more than 10 years of teaching experience. His main research areas are Natural Language Processing, Embedded Systems, Data Mining, Machine Learning. He is a member of CSI and International Association for Engineers (IAENG) also.