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DRIVER DROWSINESS DETECTION WITHAUTOMATED BRAKING AND CRASH ALERT

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ABSTRACT

These days with the increase in a working a corporate world many people have to sacrifice their time and sleep to survive in the competitive world. This takes a heavy toll on the person's life cycle and sleep cycle. To make sure that the company is operating profitably and the personal expenses are met the employees are sacrificing their sleep. This difference in the sleep cycle makes them drowsy while commuting to their work place. In case of carpooling or using the government transport people are left unharmed however if they are driving themselves then this drowsiness can put them in a great danger. For e.g. in Situbondo, a worker lost his hand because of drowsiness while working in a wood cutting machine. The system is based on processing the driver's eyes using ARM 7processor by using a VGA camera that is affixed at the dashboard of the car. We have utilized the canny edge detection process to detect the iris point and find a threshold. In case the observed threshold is met then the brakes of the car are applied and the driver is woken up.

Keywords: GPS, GSM, drowsiness detection.

1. INTRODUCTION

The main aim of eye gaze tracking based driver monitoring system is to reduce accidents caused by drowsiness. Drowsiness is mentioned as main cause in 78% of crashes and 65% of near-crashes in NHTSA (National Highway Traffic Safety Administration) study (2013).Drowsiness is a major factor in more than 20% of all accidents including fatalities and serious injuries [3]. Drowsy drivers tend to decrease attention to important information needed for safe driving which makes them prone to severe car accidents. Proposed driver monitoring system based Eye gaze tracking can help in continuously monitoring the driver. In case of drowsiness the system will track driver drowsiness and alerts him with an alarm and applies brake automatically. If the car crashes then the system sends location to emergency number through the hardware system shown in Figure-1. To reduce number of accidents caused by drowsiness is the motivation behind this project in order to improve traffic safety.

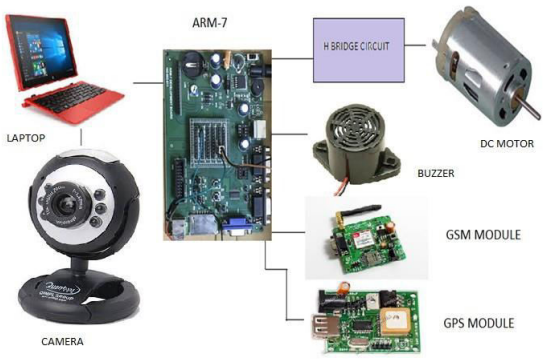

Figure-1. Hardware working system.

2. PREVIOUS WORK

A considerable measure of past work has been done on the field of drowsiness detection for over 15 years now. However a large portion of the work was on increasing accuracy of face detection and drowsiness detection by using various algorithms. In2014 O. Stan, L. Miclea and A. Centea demonstrated the cascade object method for face detection and drowsiness detection. Also real time face detection by Jian-qing Zhu, Can-huiCai[11] in 2012 using Gentle Adaboost algorithm guides the reduction of the number of weak classifiers, increasing the detection speed detection accuracy as well. To create a design that is robust to environment and save the driver Pradip V Mistary, R H Chile[10] in 2016 have come up with the idea of GPS and GSM to send location. Our paper includes each of the prior works; we use canny edge detection method with iris points that best supports for day and night and also for different angles of the driver.

3. METHODOLOGY

Image processing

The video capture process involves several processing steps. First the analog video signal is digitized by an analog-to- digital converter to produce a raw, digital data stream. In the case of composite video, the luminance and chrominance are then separated. Next, the chrominance is demodulated to produce color difference video data. Now, the information might be changed to modify brightness, contrast saturation and hue. At long last, the information is changed by a shading space converter to produce information in conformance with any of a few shading space principles, for example, RGB and YCbCr. Together, these means constituted video translating, in light of the fact that they "decode" a simple video organization, for example, NTSC or PAL.

Electronics are available to pursue the picture from the sensor and transmit it to the host Computer. The camera used is Sonix-SN9C101 to transmit its picture over USB. A few cameras for example, cell phone cameras utilize a CMOS sensor with supporting gadgets.

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Depending on the entropy values of the image near the Iris. The threshold is fixed and is compared with the standard set of parameters. If the entropy value is less than a particular threshold then the eyes are closed. The points on the iris act as the input section to the GSM, GPS, BUZZER and motor (brake).

VIDEO INPUT AND PREVIEW

```
vid = videoinput('winvideo', 1,
'YUY2_320x240');preview(vid);
pause (10); s=getsnapshot(vid); closepreview(vid)
```

CONVERTING IMAGE TO RGB

Image from Ycbcr is converted to RGB as shown in Figure-2.

```
s=ycbcr2rgb(s); imwrite(s,'test.jpg');
```

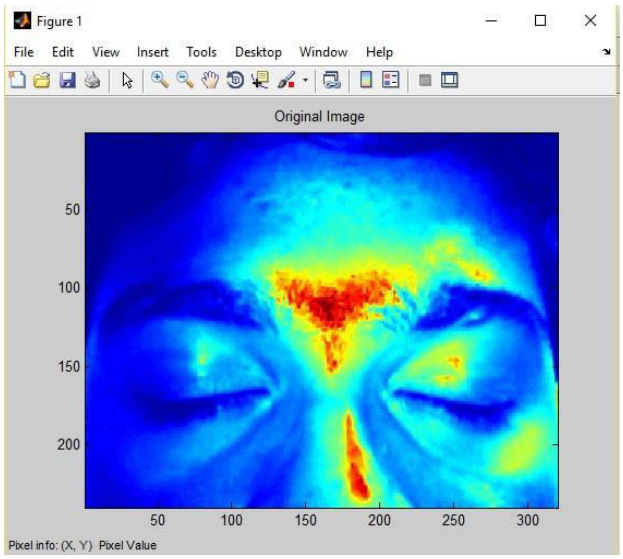

Figure-2. Image in RGB.

CALCULATING ENTROPY AND COMMUNICATING TO ARM-7

```
[ro,c,E] = eyepoint(s,8,3,4,30,0.37,'canny'); if E<=.3
msgbox('Eye is open'); s=serial('COM4'); fopen(s);
fwrite(s,'OK*'); fclose(s);
else
msgbox('Eye is closed'); s=serial('COM4'); fopen(s);
fwrite(s,'NOK*'); fclose(s);
```

BRAKE AND BUZZER

When matlab algorithm detects that the driver is drowsy then it sends information through USB to serial port to ARM-7 processor which switches the buzzer on for about 10 seconds to alert the driver and also applies brakes with the help of h- bridge as in the Figure-3 which can be set in forward and reverse bias condition to drive the motor in clockwise and anticlockwise direction with 20% efficiency for about 7 seconds to reduce the speed of the vehicle.

```
lcd_str("EYES ARE CLOSED   ");
delay(1000); IOSET0=m0; IOCLR0=m1;
delay(1000); IOCLR0=m0; IOCLR0=m1;
delay(1000); IOCLR0 = BUZZ;
delay(2000); clear5();i=0;
```

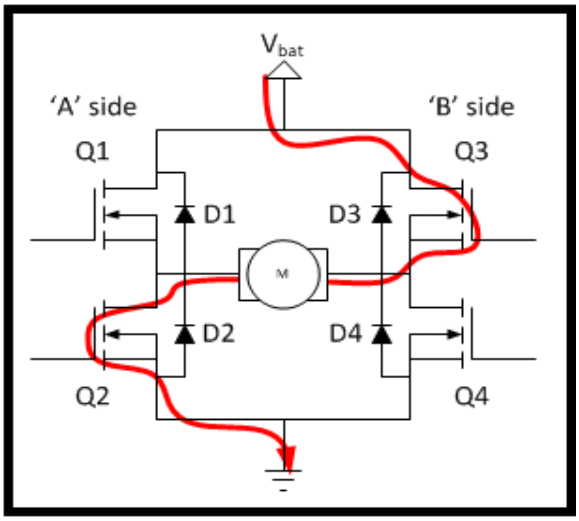

Figure-3. H-Bridge circuit.

GPS AND GSM

The switch acts as a control to the process of acquiring location. The switch is suspended beneath the bumper using bolts at a certain distance. If the car meets with an accident depending on the impact the switch is short circuited and hence it is switched ON. When the switch is in its ON condition, the GPS module in Figure-5 acquires the latitude and longitude of the vehicle and sends it to the SOS (emergency) number using the GSM module shown in Figure-4. In accordance with the driver profile we also collect the medical records of the driver (blood group, previous ailment record, medical history) to the ambulance/ hospital in order to make sure the driver is safely transported to the hospital.

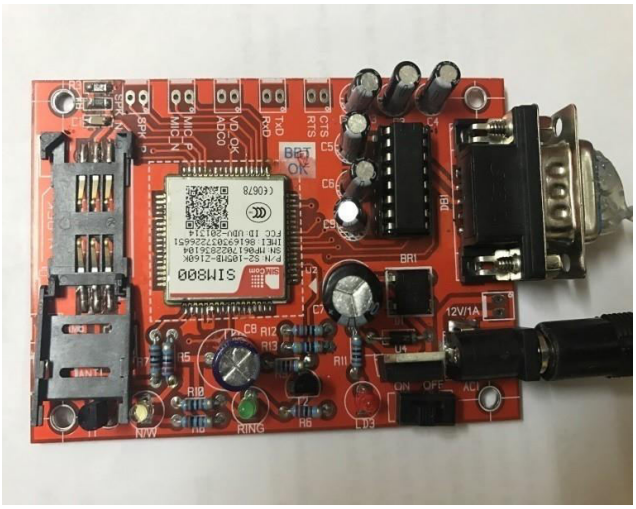

Figure-4. GSM (Global system module).

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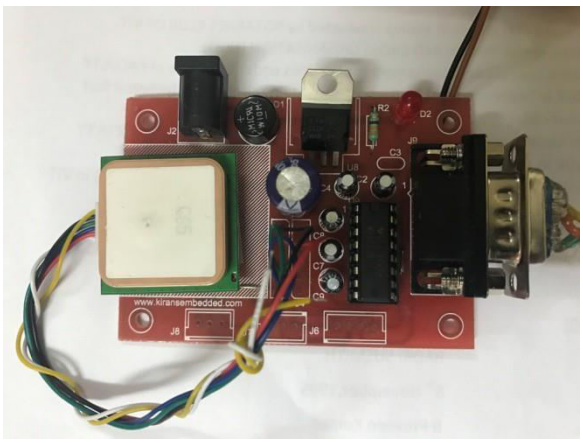

Figure-5. GPS (Global Positioning system).

4. RESULTS

The results for the various situations are as follows:

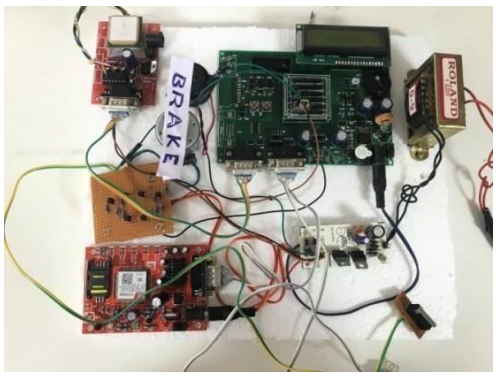

Figure-6. Hardware kit.

Figure-7. Eyes closed detected.

5. CONCLUSIONS

The goal of the system is to detect drowsiness condition of driver and alert driver with alarm and apply brakes. This is the best way to avoid accidents and also to save the life of people. We developed a system that localizes and tracks the eyes of the driver in order to detect drowsiness. During tracking, system will be able to decide if the eyes are open or closed. When the eyes will be closed for too long, a warning signal will be given in the form of buzzer or alarm and a message is sent to emergency number like 911 if accident occurs stating the location coordinates and blood group of driver.

6. FUTURE APPLICATIONS

The field we are dealing with is greatly adaptable and can be changed by our need. The examination embraced is just two men's dream to make a helpful and well- being system to diminish mischances and spare life. The model is an electromechanical framework which involves moderately bigger space limiting its utilization for pragmatic purposes. The eventual fate of this review could be to lessen the extent of the equipment by expanding the Software on Chip limit.

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