

# Automatic Driver Drowsiness Alert System using GSM

**S. Muthamil Selvan<sup>1</sup> Saurabh Kumar<sup>2</sup> Ankush Srivastav<sup>3</sup>**

<sup>1,2,3</sup>Department of Computer Science & Engineering  
<sup>1,2,3</sup>SRM Institute of Science & Technology, Chennai, India

**Abstract**— Number of road accidents are increasing day by day which can lead to severe injuries, deaths and economic losses. There are various reasons for road accidents. One of the main reasons for the increasing road accidents is driver drowsiness that needs to be addressed. Many approaches have been made but the outcome was not that successful. This paper presents a defined solution for detecting driver drowsiness. It consists of an algorithm that includes less hardware requirement. The system is approximately 90% accurate. This system includes a web camera to record a series of behaviour of eyes of the driver. This system works well under conditions of natural lighting even if the driver is wearing glasses or a cap. The output of these images are taken as an input to get the drowsiness level of the driver at a certain point.

**Key words:** Driver Drowsiness Alert System

## I. INTRODUCTION

The evolution of technology allows introduction of more advanced systems in today's world. This makes the job of employees less exhausting. The systems which are based on vision are getting popular day by day and are being used widely in various applications. Some of its uses are in industry for sorting systems, in transportation for monitoring traffic and at airport security for detection of suspected items. Fatigue is a condition which affects concentration. It also affects the response time of a human being since the being who is tired will react much slower than the one who is not tired. This condition of fatigue can be very dangerous for professions such as that of a driver.

Today, most of the professions need long duration of concentration. The people who are involved in the transportation business like car and truck drivers must be fully concentrated while driving to avoid sudden accidents. The driver gets tired due to driving for long period of time and as a result his reaction time decreases. Driver fatigue leads to microsleep which means concentration loss and a sleep which lasts for not more than 30 seconds and sometimes also falling asleep while driving. This problem of driver drowsiness is a very serious problem today. The accidents which are related to the sleepiness of a driver are most of the times very serious which leads to very serious injuries and sometimes even death. Different techniques can be used for analysing the drowsiness of the driver. Electroencephalograph and image processing based techniques are one of them. These are based on the computer vision technique which uses image processing. In this technique, the expressions of the driver like blinking of the eyes and movement of the head are used to detect the sleepiness of the driver by the researchers.

It is necessary to make a system which will detect the psychophysical condition of the driver and also notify it which will reduce the occurrence of accidents which are caused due to the driver fatigue. However, it is difficult to develop a system which can fastly and properly recognize the

symptoms of driver's fatigue. The increasing number of vehicles is resulting in the increasing number of accidents so it is must to have fatigue detection system in all the cars. The drivers of cars, trucks, taxi etc. should use this system for increasing the safety of road travellers and the goods which they carry.

## II. EXISTING SYSTEM

The system used by the Skoda cars is also similar to that of the ford cars. The steering movements are being analyzed and are compared with the movements in normal driving ones. It checks the vehicle performance in the initial 15 mins of starting the engine. The driver's fatigue level is displayed when system detects that the driving is abnormal. Heart rate analysis is also used by some systems. Some ideas has also been proposed which uses the change in driver's brain wave to detect the symptom of fatigue. The fatigue detection is not an easy task. It takes into account various factors. There are also some groups which are working on a camera based technique to detect the fatigue level. This system analyses the facial expression of the driver. By detecting the driver's emotion the system will analyze its driver's fatigue level. The eye movements, opening and closing of the eyes and the movements of mouth are being analyzed. Based on the data the driver will be informed about its fatigue level.

Many methods are already present that detect the individual facing elements. These methods are based on the vector operations and the pattern classifications. There are some methods which are based on the processing of the image in spatial frequency domain and filtering of image. The mostly used methods are neural networks, analysis of main component, gabor filters. Neural networks are used for classification of the pattern data and are therefore used in face detection and recognition system.

## III. PROPOSED SYSTEM

A camera which is able to capture a video or an image with minimum capturing capability of six megapixel without blurring is used. Apart from this an alarm system is installed which generates the output through speakers

Categorised series of headings followed below to illustrate the proposed system

- Initialize and setting the camera
- Frames of Video
- Detection of Video
- Detection of Eye
- Verify the condition for open and closed eyes

## IV. MODULE DESCRIPTION

### A. Power Supply Unit

230Volt, 50Hz, of AC signal from the board of main supply is input to a stepdown transformer. The selection of the transformer is done in such a way that the output of the transformer is from 10Volt to 12Volt. The main function of

this unit is to supply the required voltage which equals to +5V. 5V of regulated supply.

The ac voltage is stepped down to initially filtered which is done by a capacitive filter producing usually a DC voltage which has AC voltage variation. This DC input can be used by the regulator circuit to provide a regulated which not has much ac voltage variation. The voltage regulation is obtained by using a number of IC units with proper voltage regulation.

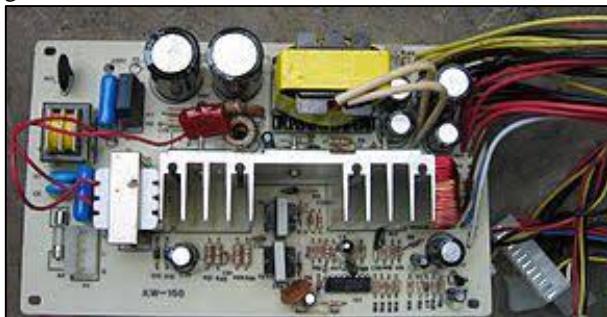


Fig. 1: Power Supply Unit

#### B. PIC Microcontroller

The microcontroller used in this system is of the PIC series. This microcontroller allows access of program simultaneously using a separate bus. The advantage of the RISC and CMOS combination is that it consumes less power and a small chip size. CMOS has an advantage that it has immunity to noise than other techniques. Some of the memories are EEPROM, EPROM, FLASH etc and flash is the latest. In flash technology even if the power is turned off the data is retained.



Fig. 2: PIC Microcontroller

#### C. GSM Module:

GSM/GPRS RS232 Modem is made with SIMCOM Make SIM900 Quadband which is from the rhydo labz. The GSM/GPRS engine is compact in size and always is easy for using as a plug GSM modem. It works on frequencies such as 850 Mhz, 1800 Mhz and 1900 Mhz. RS232 level converter circuitry is used for designing the modem which helps to directly interface PC serial port. AT command is used to configure the baud rate from 9600-115200. The modem is initially in auto baud mode. There is an internal PCP/IP stack in the GSM/GPRS RS232 to help us to connect via GPRS to the internet. In M2M interface the data transfer application and SMS both are suitable with the help of this. Three wires are needed by the modem except power supply for interfacing with microcontroller/host PC. A wide range of power supply

which is unregulated is connected with the allowance of the low dropout linear voltage regulator which is built in.



Fig. 3: GSM Module

#### D. Temperature Sensor

The temperature sensor which is being used is LM35 which is an integrated circuit sensor which is used to measure the temperature with electrical output in degree Celsius. This electrical output is proportional to temperature. When the temperature is low then the fan will switch off and vice versa. This sensor does not need an external calibration and always maintains accuracy of +/- 0.4 degree Celsius.

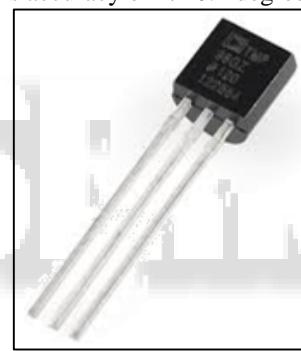


Fig. 4: Temperature Sensor

#### E. Eye Blink Sensor

The eye blink sensor performs its task by the illumination of the eye with the infrared light. The changes of the reflected light is monitored with the help of a phototransistor and a differentiator circuit. The aiming as well as the positioning of the emitter and detector affects the functionality

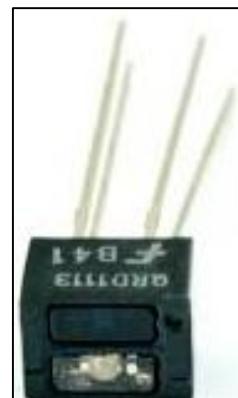


Fig. 5: Eye Blink Sensor

#### F. Heart Beat Sensor:

The heart beat sensor measures the beat of the heart. The beat of our heart can be measured by a process known as optical power variation in which light is absorbed or scattered on its path via blood as the beat of heart changes.

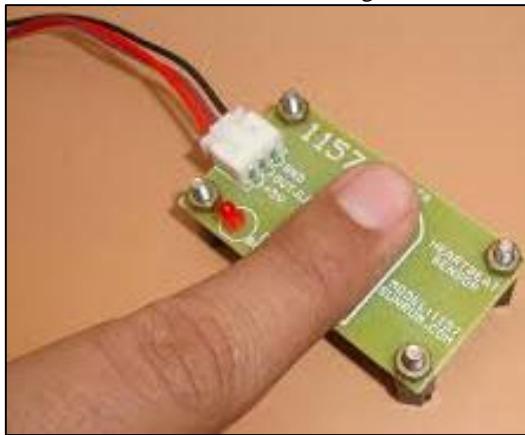


Fig. 6: Heart Beat Sensor

#### V. CONCLUSION

This study showed very good results in the application of the surveillance of driver using the technique of artificial vision and its implementation on a smartphone. The system which has been implemented efficiently detects the indicators which appear in drowsiness. The measurements are to be taken under established conditions. These conditions decide the system's correct functioning.

An application of artificial vision was only developed because of the development in the processing characteristics of smart phones which can detect the visual and facial indicators of drowsiness in a person. The indicators are head movements, state of the eyes and yawning.

This paper presents the analysis and design of the drowsiness detection system. The proposed system can be helpful for avoiding the road accidents caused by the drowsiness of the driver. According to our study we can say that by combining two or more approaches, we can reduce the limitations of the other approach and leading to the best result. This leads to the making of a very efficient driver drowsiness detection system. The image processing approaches can be combined with some vehicular and physiological measures. The main advantage of this paper is that the system is very accurate in using physiological measures.

#### REFERENCES

- [1] Real Time Driver's Drowsiness Detection System Based on Eye Conditions. By Asad Ulah, Sameed Ahmed, Lubna Siddiqui, Nahbha Faisal.
- [2] Implementation of Driver Drowsiness Detection System. By K. Srijayathi, M. Vedachary. International Journal of Science, Engineering and Technology Research.
- [3] Driver Drowsiness Detection Systems. By Damian Salaptek, Jacek Dybala, Paweł Czapski, Paweł Skalski.
- [4] An Automatic Driver Drowsiness Alert System by using GSM. By Gobhinath. S, Aparna V, Azhagunacchiya R.
- [5] <https://www.sunrom.com/p/heart-beat-sensor-digital-pulse-out>
- [6] <https://www.pantechsolutions.net/sensors/eye-blink-sensor>
- [7] <https://www.sparkfun.com/products/10988>
- [8] <https://www.indiamart.com/proddetail/gsm-module-16336685430.html>