

Survey and Implementation of Drowsy Driver Detection System

Pallavi Fatkure¹ Tejashree Kanavaje² Rupali Zore³ Prajakta Ambolkar⁴ Prof. S. K. Bhuravane⁵

^{1,2,3,4,5}Department of Information Technology

^{1,2,3,4,5}Rajendra Mane College of Engineering & Technology Devrukh,(Ambav)

Abstract— One of the main reasons for vehicle accidents in the world is the lack of attention of driver while driving. A driver gets distracted by many reasons like heavy workload, stress etc. Thousands of people are killed or seriously injured due to driver’s drowsiness each year. In this type of driver drowsiness detection system we first capture the face image of driver using a camera located insight the car. It segment only face region and excluded background portion. We choose the eye region as our decision parameter because the eye region is very dynamic in nature and drowsiness of person can only be determined by looking at eyes. If the eye is opened the situation is normal and if eyes are closed we generate an alarm signal to alert the driver. This system will help to reduce the accidents on road.

Key words: Face Detection, Eye and Eye Retina Detection, Drowsiness, Alarm, Alert

I. INTRODUCTION

The term "drowsy" is similar with sleepy, which means that going to fall asleep. The stages of sleep can be categorized as awake, rapid eye movement, etc. The crashes occur due to driver drowsiness have number of characteristics such as it occur late at night or during mid-afternoon, Heavy stress on mind of driver, Heavy workload, etc.

Driver drowsiness causes the road accidents and can lead to more physical injuries, deaths and significant economic losses. In current way, over 1.3 million people die each year on road and 20 to 60 million people injured due to the accidents. A driver who feels asleep at that time he/she loses control of the vehicle, it results in a crash with either another vehicle or any stable object or thing. The driver fatigue is most important factor in large number of vehicle accidents. The development technologies for detecting and preventing the drowsiness are a major challenge in the field of accident avoidance systems.

There are many technologies used for drowsiness detection and can be divided into three main categories as Biological indicators, Vehicle behavior and. In biological indicators measures the pulse rate, heart rate, brain waves, etc. These techniques required the clear and best detection part but they must have physical contact with driver. These techniques are difficult to implement in real life. In vehicle behavior measures the speed, lateral position, turning angle, etc. These techniques can be implementing but they have some limitations such as vehicle type, driver experience, driving conditions and also required costly equipment. In face analysis, human face is dynamic and has high degree of variability. Human eyes plays important role in facial expression and recognition. In fact the eyes are stable feature on face in comparison with other facial features. Therefore, when we detect the facial features, it is better to detect the eyes before the detection of other facial features in system. The position of other facial features can be detected by using eye position.

II. RELATED WORK

As various techniques of driver drowsiness detection are mentioned by Vandana Saini et al.^[2] behavioral based technique is used. It detects the driver position, face eye etc. through camera to alert the driver by giving warning. Riya Bansode et al. ^[1] proposed the method of implementation to design the driver drowsiness detection System. To detect the face and eyes, there is used Haar Cascade Classifier which is machine learning algorithm. The eye retinas detected by the circular Hough transform. System configuration explained by Neeta Parmar et al. ^[3] of camera, light source, vehicle type used. The camera is placed in front of driver, approximately 25-30 cm away from face of driver.

III. PROPOSED SYSTEM

The goal of our proposed system is to detect the drowsiness of driver. The need of driver drowsiness detection system is to alert the driver before any incidence happens. So first, the system consist the web camera which placed in the way that it records the drivers face. Then Region of Interest(ROI) is location of mouth, eyes and eye retinas, which are detected and indicated by rectangle and circles respectively. Then identify whether the eyes are opened or closed. If eyes are opened then alarm will buzz to alert the driver from drowsy state to drive the vehicle otherwise process will continue.

IV. MODULES

The system is basically divided into four main parts:

- Face detection
- Eye Detection
- Eye Retina Detection
- Drowsiness Detection

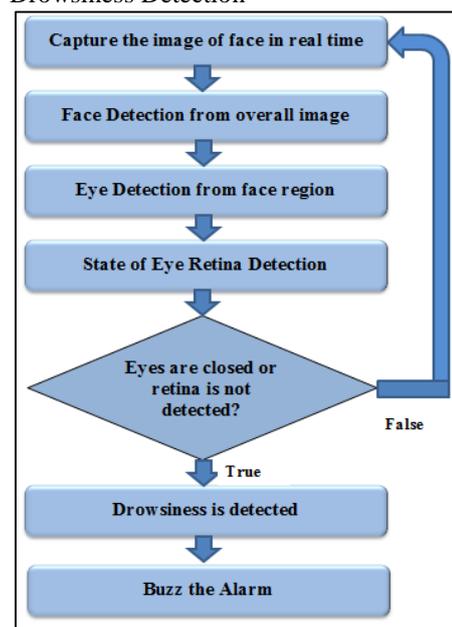


Fig. 1: Flow chart of Driver Drowsiness Detection System

A. Face Detection

Due to the human face is dynamic and high degree of variability; the face detection is considered to be a complex task in computer vision. The scientists and computer researchers have developed and improved different face detection technologies.

The face detection is important step in all face processing systems. The efficiency of it is effects on the overall performance of drowsiness detection system. The face detection has various approaches: the top down feature approach i.e. search the various faces at different scale level, bottom up feature approach i.e. search the image for different facial features, texture based approach i.e. detect the face by determining the spatial distribution of gray or color information, neural network based approach i.e. faces are detected by sampling different regions and passing it to neural network, color based approach i.e. labels each pixels according to its similarity to skin color and face shape, motion based approach i.e. take image subtraction to extract the moving features from the static background.

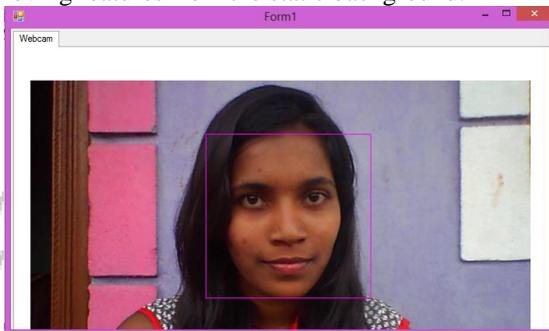


Fig. 2: Face Detection

B. Eye Detection

Face and Eye detection are based on Haar like features. Out of face region eye must be detected.

C. Emgu CV

Emgu CV is cross platform of .NET wrapper to the OpenCV image processing library allows the OpenCV functions to be called from .NET and others languages like c, c++, VB, etc.

D. Haar Cascade Classifier

Haar Cascade classifier is used to detect the face as well as eye region detection. It is machine learning algorithm included with Emgu CV. The Haar Cascade Classifier contains the number of features of eyes and faces. Initially, it load the casacade file and then pass the acquired frame to Edge detector and then compare with cascade file to detect eyes and face. Using Eye-Haar Classifier eyes are detected and rectangles are drawn around the left and right eye. ^[1]

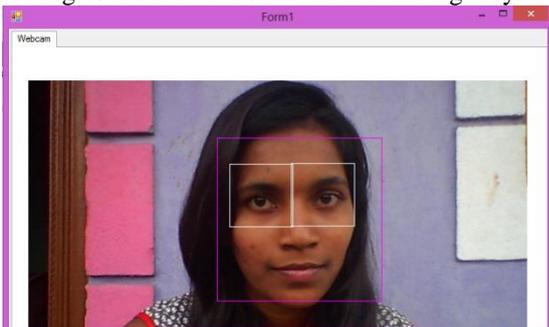


Fig. 3: Eye Detection

E. Eye Retina Detection

Eye Retina Detection is the most important stage in the driver drowsiness detection System.

F. Hough Transform

Hough Transform is a features extraction technique used to detect the eye retina. Here, we the circular Hough Transform for this purpose. This technique finds the imperfect instances of object within the certain class of the shapes.



Fig. 4: Eye Retina Detection

G. Drowsiness Detection

The decision of drowsiness is taken by measuring the eye closure time. It is most popular method. The time that the eye closed is measured. In real-time system, if eye closure time of driver is too long that of fix in program then alarm will warn to alert the driver.

ACKNOWLEDGEMENT

It is a great opportunity of immense pleasure for us to present the project "DROWSY DRIVER DETECTION SYSTEM" expressing our hearty gratitude to all those who have generously offered their valuable suggestions towards the completion of the project.

Today's computing world has contributed immensely to the wide spread progress of digital communication and automation, that inspired us to undertake this project which is challenging and fascinating as well. The credit goes to our project guide PROF. S.K.BHURAVANE and H. O. D. IT Department PROF. M.Y.GADAKARI whose positive attitude, moral support and encouragement lead to the success of the project. We are also graceful to our project coordinator PROF. S.S.KOLEKAR for his guidance and valuable suggestion, important to us from time to time. We are also thankful to our Principal DR.M.M.BHAGAVAT for being very generous with his advice and encouragement. We also thank our lab-in-charge for giving all kinds of help to us.

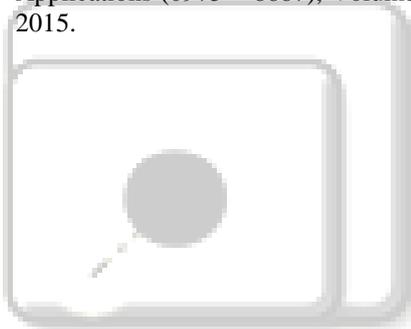
V. CONCLUSION

There are the many techniques used to detect the face and eyes position. During monitoring the whole system, face and eyes detected. Then it goes to decide that whether the eyes are opened or closed. If the eyes are closed and retina did not detect then alarm gives warning to alert the driver.

This method achieves the accurate and reliable output. Because of system, we can reduce the accidents rate on road.

REFERENCES

- [1] RiyaBansode, SonamPashte, SejalSawant, Asst. Prof. S.K. Sabnis," Drowsy Driver Detection System", International Journal for Scientific Research and Development, Volume 3, Issue 01, 2015.
- [2] VandanaSaini, RekhaSaini, Research Scholar CSE Dept. Panjab, "Driver Drowsyness Detection System And Techniques : A Review", /(IJCSIT) International Journal Of Computer Science And Information Technology, vol. 5(3), 2014.
- [3] "Drowsy Driver Detection System" Design Project By: Neeta Parmar Instructor: Peter Hiscocks, Department of Electrical and Computer Engineering, Ryerson University.
- [4] Philip, P.; Sagaspe, P.; Moore, N.; Taillard, J.; Charles, A.; Guilleminault, C.; Bioulac, B. Drowsiness, sleep restriction and driving performance. *Accid. Anal. Prevent.* 2005, 37, 473–478.
- [5] Mr. Raees Ahmad, Prof. J.N. Borole, "Drowsy Driver Identification Using Eye Blinkdetection", (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 6 (1) , 2015, 270-274.
- [6] Vrushali B.Ghule, Asst. Prof. S.S.Katariya, "Drowsiness Detection Methods for Driver's: A Review", International Journal of Computer Applications (0975 – 8887), Volume 122 – No.19, July 2015.



IJSRD