

Conflict Solving with the Use of Driver Distraction

Mr. Vaibhav Rathod¹ Prof. Mrs. Ranjana Agrawal²

¹Student ²Professor

^{1,2}Department of Computer Engineering

^{1,2}MIT, Pune, Maharashtra, India

Abstract— Distracted driving is one of the main causes of vehicle collisions. The activities such as a text, talking on a mobile phone and conversation with a neighbouring person distracts the driver from driving may cause accidents. This distraction may cause sudden death of driver, pedestrian and may destroy vehicles on the road. Project's primary motto is to identify alertness in driving. If a car driver is intoxicated or if the driver is to be sleeping or yawning or distracted from driving. Then the sound is continuously played to alert the driver and send a notification to the admin. The behavior of the driver is continuously evaluated. Haar cascade is used to detect eye and face from the captured image. Yawing is detected from the face image using eye, nose, and mouth order. It is designed for the safety of people traveling by car.
Key words: Image Processing, Drowsiness Detection, Alcohol Detection, Haar Algorithm, Open CV

I. INTRODUCTION

Many hard works have been made recently to ensure the driver safety and to decrease car accidents. According to, around 80% to 90% of accidents involving fatalities or injuries are mainly related to the driver's absence of alertness. Specifically, the driver's alertness is affected by distraction and exhaustion. In order to detect whether the driver is distracted or fatigued, many car manufacturing companies have started to embed audio-visual sensors in intelligent vehicle systems.

Driver distraction can be of three types visual, manual and cognitive

A. Visual

The most frequent cause of distraction is this. Some of the attractive visual things that may take the drivers eyes and focus away from the road, for a moment. The actions like view a text message, Viewing direction maps or looking outside while driving can cause a distraction. The entire factors keep the driver aside from focused on the driving.

B. Manual

It might happen when the driver is taking one or both of their hands off the steering for any basis. It may be to respond a call or forwarding a message while driving.

C. Cognitive

These distract your mind on driving. If any of other things grab your awareness you are unable to concentrate on the road, and it may lead to potential accidents. This might happen due to mental pressure, personal or financial issues, chatting with others and using the mobile phones.



Fig. 1: Types of Driver Distraction

With the help of CAN, the high-speed communication over a control network is possible. ARM 7 [1] is used to achieve high performance. The ECG, eye blink and alcohol consumption can be detected is done with this system. When a someone wishes to drive, will have to only press the finger in the system after matching the vein the vehicle gets started, If the matching is unsuccessful then GSM get activated and transmits warning message. The system can also identify fatigue and alcohol consumption by the diver. The Jones algorithm [2] is intended for face detection. Eye regions are detected as right and left regions. It needs a positive image and negative image to train the classifier. The accuracy obtained for the gawk direction was around 75 percent. Viola Jones algorithm that uses AdaBoost algorithm [3] pick up the features of face detection and to train the classifier. If any of other things grab your awareness you are unable to concentrate on the road, and it may lead to potential accidents. This might happen due to mental pressure, personal or financial issues, chatting with others and using the mobile phones.

The Driver Fatigue Detection [4] can vigorously check driver's attention level and alert the driver to any anxious driving state. In that drowsiness detection of the driver is based on violations algorithm for eyes and face detection.

II. PROPOSED SYSTEM

A. Architecture

These systems expose the reviews the problems pertaining to driver modeling for the detection and evaluation of distraction. The studies areas are as follows 1) understanding driver diversion and behavior, 2) activity identification and distraction testing, 3) visual tracking and glance behavior.

1) Image Capturing

Raspberry pi based camera constantly takes the driver pictures and stores it on SD card. Capturing of images is done using OpenCV and Java module.

2) Detect Eyes

With the help of Haar cascade eyes and face are detected from the captured image. If it detects closed eye then an alert is made to the driver.

3) *Detect Yawning*

Haar cascade also identifies the face from the captured image. Yawning is detected with face and an eye image i.e. eyes are closed and mouth is open.

4) *Detect Distraction from Driving*

Project's main goal is to identify alertness in driving. If the driver is found to be distracted from driving, then the sound is continuous played to alert the driver.

5) *Play Buzzer, Glow LED & Notify Admin*

Raspberry is connected to LED and buzzer modules. In case the driver is distracted, then buzzer is played and led glows.

6) *Send Data to Server*

User driver statistics are synchronized to the server.

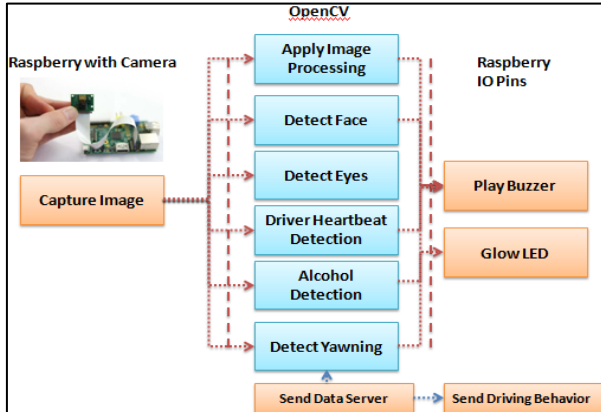


Fig. 2: Architecture Diagram

B. *Haar Cascade Algorithm*

Video/Image capture with analyzing the attributes like face detection and object detection can be done using Open CV. The tool used for db functionalities was MYSQL GUI Browser.

The Haar cascade is used for the object detection. It is a machine learning Approach with cascade function which is trained from numerous negative and positive images and then used in object detection from images.

Training procedure to generate a Haar-like Classifier:

- Gathering of positive and negative training images
- Marking positive images using objectmarker.exe or Image Clipper tools
- Creating a .vec (vector) file depending on positive images with the use of createsamples.exe
- With the help of haartraining.exe, the classifier is trained.
- Execute the classifier with cvHaarDetectObjects ()

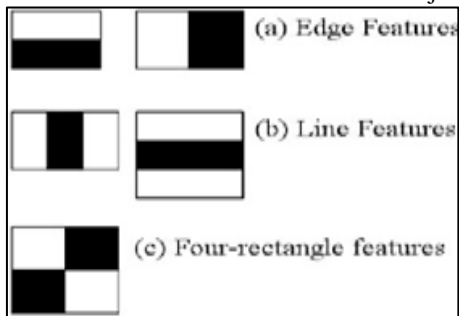


Fig. 3: Classifier Features

C. *Experimental Results*

The experimental setup of the project is as shown in Below Figure.

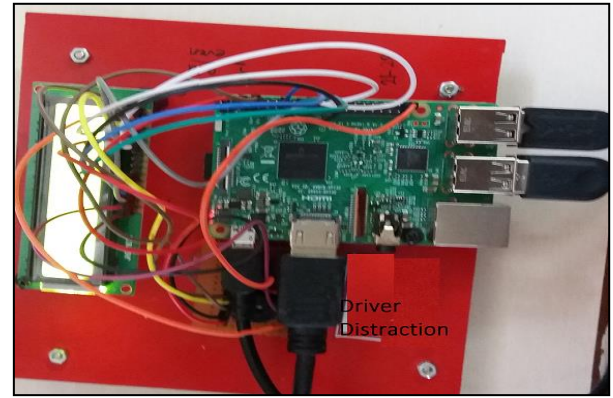


Fig. 4: Experimental Setup

The driver's eye, face are detected with the help of camera i.e. if they are on the right track or not.

When the driver's concentration is on road LCD displays the message that driver is not distracted.

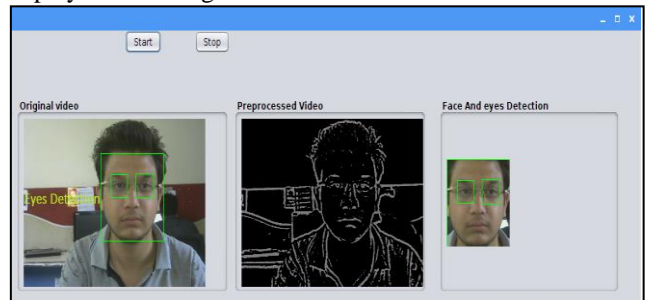


Fig. 5: Eyes Detection

This system will actually give buzzer sound if a driver is diverted from driving and message is displayed on LCD as "DRIVER DISTRACTED" as shown in figure 9. An alert is given to the driver and warning is forwarded to the admin.

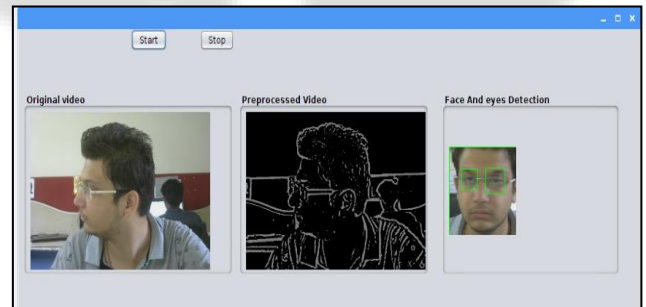


Fig. 6: Driver Distracted

When the driver is feeling sleepy in that case the eyes are closed and mouth is open again an alert sound is given with message DRIVER IS DROWSY" showing on LCD.

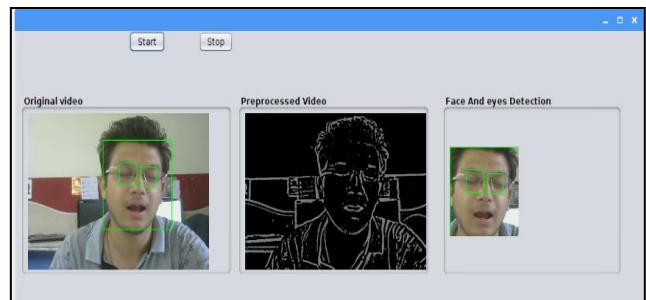


Fig. 7: Driver Is Drowsy

If drivers eyes are open and mouth is open as shown in figure 8 then alert is given and the message is displayed ”DRIVER IS YAWNING”

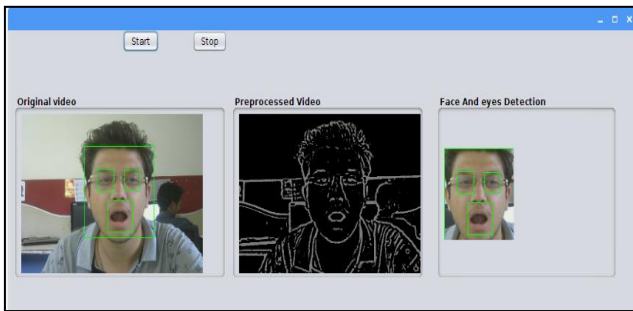


Fig. 8: Driver Is Yawning

If driver’s eyes are open and mouth is open as shown in fig.7 then alert is given and the message is displayed “DRIVER IS YAWNING”

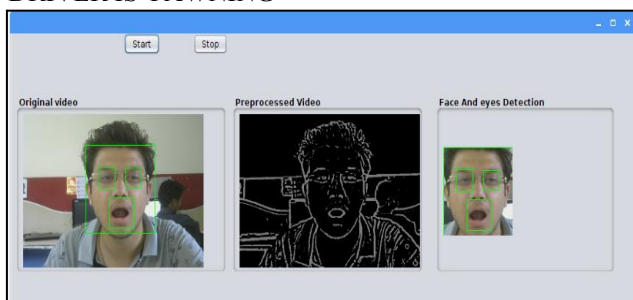


Fig. 9: Driver Is Drowsy Yawning

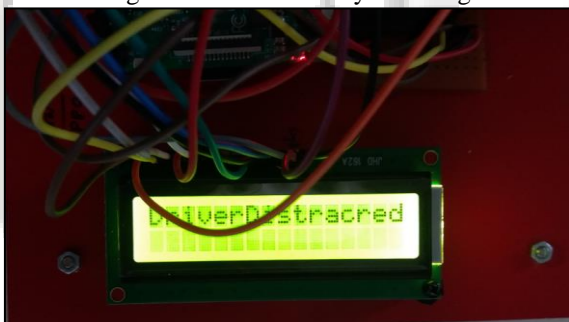


Fig. 10: Distraction Message on LCD

D. Algorithm Accuracy

With the Haar classifier, it is possible to detect mouth, face, and eyes in less time compared to other methods. Cascade function is qualified from a lot of negative and positive images. Then it is used to identify objects in other images. So gives high accuracy than others. The table gives the accuracy of a different algorithm showing Haar classifier having highest percentage accuracy.

| Algorithm Comparison | | | | | |
|----------------------|-----------------------------|-------------------|---------------|----------|------------|
| Features | Algorithms | Time Required(ms) | Tested Images | Accuracy | % Accuracy |
| Face Detection | LBP Classifier | 130 | 100 | 61 | 0.61 |
| | Voila Jones | 125 | 100 | 75 | 0.75 |
| | HAAR Cascade (Our Approach) | 105 | 100 | 80 | 0.8 |
| Eyes Detection | LBP Classifier | 22 | 100 | 62 | 0.62 |
| | Voila Jones | 18 | 100 | 70 | 0.7 |
| | HAAR Cascade (Our Approach) | 16 | 100 | 75 | 0.75 |
| Mouth Detection | LBP Classifier | 19 | 100 | 62 | 0.62 |
| | Voila Jones | 15 | 100 | 72 | 0.72 |
| | HAAR Cascade (Our Approach) | 15 | 100 | 75 | 0.75 |

Table 1: Comparison

The graph shows how the accuracy of detection in the different algorithm. The proposed algorithm is having greater accuracy of detection compared to other.

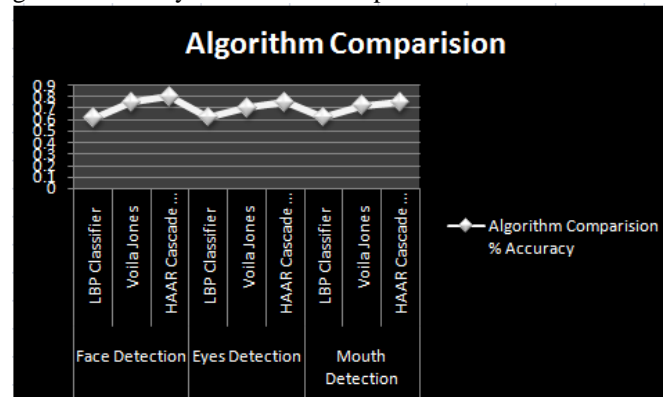


Fig. 11: A Plot of Algorithm Comparison

III. CONCLUSION

In order to reduce road accidents, there is also a need to detect the causes such as drowsiness, fatigue and to alert the driver. We develop a system, which helps to the drivers effective and careful driving and gives the information about the driver’s behavior while driving. It also gives an alert when the driver is intoxicated that help to protect the pedestrian or driver as well.

This will, in turn, provide both securities as well as protection to the vehicle as well as the driver driving the vehicle. If such systems come into existence lots of lives can be saved.

REFERENCES

- [1] Lorraine Saju, ChristeenaJestine, Farzana Yasmin, and Surekha Mariam Varghese, ”Drowsiness Detection System for Drivers using Haar training and Template Matching”, International Journal of Engineering Applied Sciences and Technology, Vol. 1, Issue 6, pp. 106 - 110, 2016.
- [2] Shewata Maralappanavar, Reenakumari Behera, Uma Mudenagudi, ”Drivers Distraction Detection based on gaze Estimation”, 2016 International Conference on Advances in Computing, Communications and Informatics (ICACCI).
- [3] Xuesong Wang, chuan Xu”Enhanced eye gaze direction classification using a combination of face detection, CHT and SVM”, Signal Processing in Medicine and Biology Symposium (SPMB), 2013 IEEE.
- [4] "Varsha.E. dahiphale and Prof.sathanarayanaR, "Computer Vision System for Driver Fatigue Detection", International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE), volume 04, Issue - 9, pp - 2331 - 2334, 2015.
- [5] John H.L. Hansen, Carlos Busso, Yang Zheng, and Amardeep Sathyanarayana”Driver Modeling for Detection and Assessment of Distraction”, , IEEE Signal Processing Magazine — July 2017 — 1053-5888/172017IEEE.
- [6] T.D Prasanthi, K.Rajasekhar, T.V.Janardhanarao, and B.V.V.sathanarayana,”Design of ARM-based face Recognition system using Open CV library”,

- International Journal of Advanced Research in Computer and Technology(IJARCET), Volume 01, Issue - 9, pp - 233 - 240, 2012.
- [7] DhavalPimplaskar, Dr.M.S.Nagmode, Atul Borkar,"Real Time Eye Blinking Detection and Tracking Using OpenCV", International Journal of Engineering Research and Application, Vol.03, Issue 05, PP - 1780 - 1787, 2013.
- [8] Naveen M. and Sudarvizhi S., "Finger Vein Recognition Based Driver Authentication and Alertness System Using GSM", International Journal of Research in Engineering & Advanced Technology (IJREA T), Volume 3, Issue.
- [9] Shinko Y. Cheng and Mohan M. Trivedi,"Real-time Vision-based Infotainment User Determination for Driver Assistance".2008 IEEE Intelligent Vehicles Symposium Eindhoven University of Technology Eindhoven, The Netherlands, June 4-6, 2008.

