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# DRIVER DROWSINESS AND FATIQUE DETECTION USING PYTHON

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## ABSTRACT

Drowsiness, fatique and tiredness while driving a car is very common nowadays and this leads to increase in the number of accident . So, now the question how we can decrease the number accident on the road. For decreasing the number of accident on the road we can follow two methods: 1.First method is by detecting the pulse rate and heart beat of a person using digital equipment. 2. Second method is using open cv in these we detect the facial expression, mainly the eyes of the person as soon as the person eyes get closed for a couple of second the alarm would get raised in the car after applying both the methodology, we came to the conclusion that the second method is more better as it is less expensive and more accurate.

**Keywords:** Detection, Driver Drowsiness.

## I. INTRODUCTION

One of the key causes behind the casualties of individuals in road accidents is driver's temporary state. once continuous driving for very long time, drivers easily get tired ensuing into driver fatigue and temporary state. analysis studies have explicit that majority of accidents occur because of driver fatigue. Different countries have completely different statistics for accidents that occurred because of driver fatigue. Developing technology for police investigation driver fatigue to reduce accident is that the main challenge. consistent with the report by "Ministry of Road Transport & Highways" there have been four,552 accidents reported every year in Asian country, that took lives of thousands of individuals due to sleepy-eyed drivers(Road Accidents in Asian country 2016). as an example, several vehicles area unit driven principally in the dead of night like loaded trucks. The drivers of such vehicles United Nations agency drive for such continuous long amount become a lot of vulnerable to these styles of things. police investigation temporary state of drivers remains AN current analysis so as to scale back the quantity of such miss-happenings and accidents. Typical ways accustomed determine drowsy drivers area unit physiological based mostly, vehicle based mostly, and behavioural based(S. Sangle, B. Rathore, R. Rathod, A. Yadav, and A. Yadav,2018)–( A. Kumar and R. Patra,2018). Physiological ways like heartbeat, pulse rate, and Electrocardiogram(T. Hwang, M. Kim, S. Hong, and K. S. Park,2016), (S. Junawane, S. Jagtap, P. Deshpande, and L. Soni,2017) etc. area unit accustomed detect fatigue level. Vehicle based mostly ways embody accelerator pattern, acceleration and steering movements. behavioural methods(S. Sangle, B. Rathore, R. Rathod, A. Yadav, and A. Yadav,2018)–( A. Kumar and R. Patra,2018) embody yawn, Eye Closure, Eye Blinking, etc. To encounter this worldwide downside, an answer that captures pictures during a succession, transmits time period driver's information to the server, and determines temporary state using EAR (Eye side Ratio) and ECR (Eye Closure Ratio) has been projected and enforced victimization automaton application. The computed worth via the system prompts the driving force to require an opportunity or rest for a few time. The ways used area unit non-intrusive in nature; therefore, no further prices would be incurred throughout the course of the temporary state detection methodology. the remainder of the paper is unionized as follows. In section a pair of, the literature review is bestowed. It presents the projected approach to observe driver's temporary state. It conjointly details the elements that area unit developed as a part of application to reckon EAR and ECR. And describes comparison of the projected approach with existing approach. Also it describes the performance analysis with discussion of experimental results.

## II. REVIEW OF LITERATURE

In this segment, we have discussed various methodologies that have been suggested for drowsiness detection and blink detection during the recent years. Manu B.N in 2016, has suggested a technique that detect the face using Haar feature-based cascade classifiers. Initially, the method needed a lot of positive images (images of faces) and negative images (images without faces) to train the classifier that will detect the object. So alongside Haar feature-based classifiers, cascaded Adaboost classifier is used to identify the face region then the neutralized image is divided into numbers of rectangle areas, at any position and scale within the original

image. Haar- like feature is efficient for real-time face detection, because of difference of facial-feature. These can be estimated as stated by the difference of sum of pixel values within rectangle area and during the process, the Adaboost algorithm will allow all the face instances and it will discard the non-face instances of images. Amna Rahman in 2015, has suggested a process to detect the drowsiness by using Eye state detection with Eye blinking approach. In this process first, the image is converted to gray scale and the corners are detected using Harris corner detection algorithm which will detect the corner at both side and at down curve of eye lid. After discovering the points then it will make a straight line between the upper two points and locates the mid-point by calculation of the line, and it connects the mid-point with the lower point. Now for each image it follows the same approach and it calculates the distance 'd' from the mid-point to the lower point to deduce the eye state. Lastly, the selection of the eye state is made based on distance 'd' calculated. If the distance is zero or is close to zero, the eye state is categorized as "closed" otherwise the eye state is categorized as "open". They have also enforced intervals or time to know that the person is feeling drowsy or not. This is done when the average blink duration of a person is 100-400 milliseconds (i.e. 0.1-0.4 of a second).

## III. METHODOLOGY

We have two method to detect the drowsiness of the driver.

**Detecting the pulse rate and heart beat**

We can detect the fatique of the driver by measuring the pulse rate and heart beat. But for this driver has to wear the equipment all the time .Also In this method the cost of equipment is very expensive.

**Real Time Computer Vision Systems**

In this method, we detect the face expression of the driver such as eyes, mouth, eye bros using the opencv and dlib library. By calculating the euclidean distance of the eye ,we drive a ratio containing horizontal and vertical part of the eye .if the ratio of eyes decrease to the level of 2 our model raises an alarm for alerting the driver.

The image below shows the indexes of the 68 coordinates:

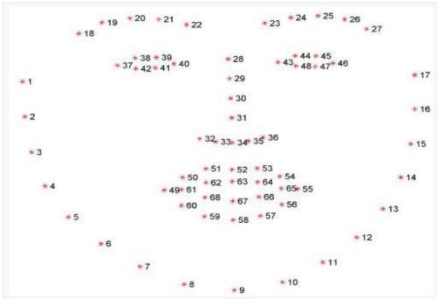

**Fig.-1:** Facial Landmark Point according Dlib Library

The eye aspect ratio (EAR) between height and width of the eye is calculated.

$$EAR = \frac{||p2 - p6|| + ||p3 - p5||}{2||p1 - p4||} \quad (1)$$

where p1, . . ., p6 are the 2D landmark locations, depicted in Fig. 2. When an eye is open the EAR remains constant and gets close to zero while closing an eye.

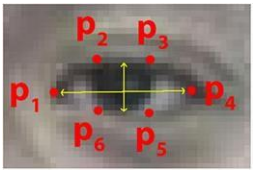


**Fig.-2:** Eye Landmark Points

## IV. RESULTS AND DISCUSSION

The Drowsiness detection with Python and OpenCV was implemented using the following steps: Successful runtime capturing of video with camera. Captured video was separated into frames and each frame were analysed. Than the Successful detection of face followed by detection of eye is done. If eye remains closed for successive frames and were detected, then it is classified as drowsy condition else it is considered as normal blink and the loop of capturing and detecting the image and analysing the situation of driver is carried out again and again. When the person is in drowsy condition the eye is not surrounded by circle or it is not detected, and alarming sound is made to awake the driver.

## V. CONCLUSION

This paper proposed a method for detection of driver drowsiness from video. Here, a method for automatically measuring facial expressions was employed to determine spontaneous behavior during real drowsiness event. A real-time eye blink detection algorithm was proposed. We displayed that Haar feature-based cascade classifiers and regression-based facial landmark detectors are accurate enough to reliably estimate the positive images of face and a proportion of eye openness. This project also shows the significance of using instances of fatigue and drowsiness conditions in which the person actually fall sleep.

## VI. REFERENCES

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