

# Driver Drowsiness Detection System using openCV and keras

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**Abstract** - A computer's vision-based thoughts concept has been used for creating this Drowsy Driver Detection System. The camera being the initial point of the system by providing the live feed of the driver to the framework that concentrates it straight towards the face of driver and checks the driver's eyes with a particular objective to catch drowsiness of the driver. On analyzing the live video an alert is issued to the driver in circumstances where drowsiness is outcome of the analysis. The framework moves the control of the program forward using information picked up from the picture to find the facial tourist spots, which helps the system to identify where the eye's location of an individual exist. If the eyes of driver are closed for a specific amount of time, the proposed framework draws a conclusion that the driver is feeling drowsy and an alarm for safety is sound. The system works after initially face is recognized and eyes are spotted, it also works well in dim lighting conditions too.

**Keywords:** Drowsy Driver Detection, Facial tourist spots, Alarm, lighting conditions

## 1. INTRODUCTION

With the increasing pace of life and work the human beings have started compromising with the thing they need most, to efficiently function in a given situation i.e., adequate rest and sleep to be active while doing a task. Driver's drowsiness is a very cautious thing and has already led to a lot of mishaps. Some researchers even provide a data that nearly 1200 deaths and 76000 major injuries are caused due to the fatigue driver was facing which eventually led to a crash. With the help of modern-day technology and real time scanning systems using cameras we can prevent major mishaps on the road by alerting car driver who is feeling drowsy through a drowsiness detection system. The point of this undertaking is to build up a prototype drowsiness detection system. The spotlight will be put on planning a framework that will precisely monitor the open or shut condition of the driver's eyes continuously. By concentrating on the eyes, it has resulted that the onset of driver fatigue can be detected to avoid a car accident. Detection of drowsiness depends on the eye movements and time elapsed between blinks to help generate a score on which a driver is assessed if he is drowsy or not. To prevent these accidents, we have developed a system using python, open Cv and keras which works on the live feed of the driver through a webcam which is then processed to generate a score based on the time between eyes closing and opening and when eyes are closed for a long time the score starts increasing and when it reaches a certain mark the alarm starts beeping alerting the driver and waking him up.

### 1.1 Primary Goal

Driver drowsiness detection is a car safety technology which helps to save the life of the driver by avoiding mishaps when the driver is feeling tired. A) The primary goal is to initially plan a framework to distinguish driver's sluggishness by persistently checking retina of the eye. B) The framework works disregarding driver wearing displays and in different lighting conditions. C) To caution the driver on the identification of laziness by utilizing ringer or alert. D) Speed of the vehicle can be reduced. E) Traffic management can be maintained by reducing the accidents.

### 1.2 The Computer's Vision

PC's vision is the change of information from a still, or camcorder into either a depiction or another choice. Each and every such changes are performed to achieve a particular target. A Computer gains a cross section of numbers from a camera or from the circle, and it's just as simple as that. For the most part, there is no worked in example acknowledgment or programmed control of center and gap, no cross-relationship with long periods of experience. Generally, vision frameworks are still reasonably gullible.

### 1.3 OpenCV

OpenCV is an open-source computer source library available in python encoding to encrypt the visual skills of our smart pc. OpenCV was expected for computational capability and having a high focus on ongoing picture location and distinguishing proof. OpenCV is coded with streamlined C and can take work with multicore processors. If we need progressively programmed improvement utilizing Intel models [Intel]. These comprise of low-level schedules in different algorithmic regions which are streamlined. OpenCV therefore uses the IPP library, at runtime if that library is introduced.

### 1.4 Why Open CV?

A) Specific OpenCV was planned for picture handling. Each structure and structure of the information is visualized in the Image Processing Plan. Then, Matlab, is very conventional. You can get almost everything on the planet by methods for tool compartments. It may be money related tool stash or then again concentrated DNA tool compartments. B) Speedy Matlab is just excessively moderate. Matlab itself depended on Java. Similarly, Java depended on C. So, when we run the Matlab program, our PC gets caught trying to translate and integrate all of this integrated Matlab code. It is then converted to Java, eventually using code. C) Efficient Matlab uses an excessive amount of system assets. With OpenCV, we can extract as much as 10mb RAM for continuous application. Aside from the fact that with current PCs, the RAM feature is by no means a significant concern. In any case, our fatigue screen will be used inside the car in a non-slip and non-slip way; therefore, the need for low management is important.

### 1.5 Machine Learning

The purpose of AI is to convert information received into usable data. After benefiting from the issue of social information, we need a machine that can answer any questions related to that information.

### 1.6 OpenCV's Machine Learning Algorithms

ML statistics embedded in OpenCV are provided as follows. All statistics are available in the ML library separated by Mahalanobis and K-implication, found in CVCORE, as well as facial recognition calculations, found in CV.

## 2. Methodology

The main purpose of this paper is to produce a simple and easy-to-use system that will lead to a safe road trip.

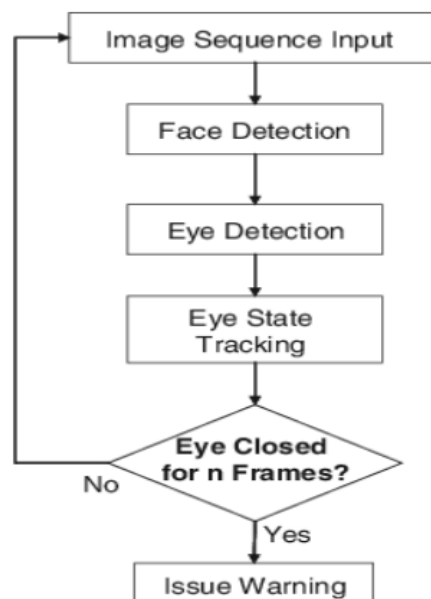


Fig 1

Fig 1 shows the method used to develop the system to an efficient way. The algorithm used to process the image to feed the code to specify the face in the image, the image is divided into sub-regions to determine whether the region is on the face or not. The use of this algorithm means a time-saving method and only face-containing domains are processed.



Fig 2

Fig 2 shows how the system would work and look in real world



Fig 3



Fig 4



Fig 5

Fig 3,4,5 Show the real time test case generating a score based on the time the eyes were closed and sounding an alarm when reaching certain threshold.

### 3. Results

Following is the table representing four test cases that are to encountered while doing this project that concerns with the drowsiness of the driver.

Test cases	Eyes Detected	Eye closure	Result
Case1	NO	NO	No result
Case2	NO	NO	No result
Case3	YES	NO	No alarm
Case4	YES	YES	Alarm beeps

Table1. Test Cases There is a point where the eyes are closed above a certain number of edges when we find that the driver feels tired. From now on these cases are prominent and warned. Finding the result did not take large photographs and attempts were made to determine the blink of an eye and drowsiness. For this project we used a 5-megapixel webcam compatible PC. The webcam had a built-in white LED attached to it to show that it was working. In the case of real-time, infrared LEDs should be used instead of white LEDs for the purpose of framing. The built-in speaker is used to deliver sound output to wake the driver when drowsiness is detected. The frame is designed for different people in different light conditions (day and night). When the point at which the background light of the webcam is turned on and the face is kept aligned, then the frame can detect blinking and drowsiness with more than 95% accuracy.

I/p	Eyes Detection Accuracy	Drowsiness Accuracy
Sample 1	100%	87.5 %
Sample 2	95%	100%
Sample 3	80%	62.5%
Sample 4	100%	87.5%
Sample 5	100%	100%

<b>TOTAL</b>	95%	87.5%
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Table 2

Eye Detection Accuracy = total number of times eyes detected / (total Drowsiness Detection Accuracy = total no. of times alarm sounds / (total no. of times alarm sounds + total no of times alarm didn't sound).

#### 4. CONCLUSION

With the help of study aids and research papers we conclude that the driver's drowsiness program is important and should be a mandatory part of a driver's life. Therefore, we would successfully design and improve the implementation of the Driver Drowsiness Detector using Python and OpenCv and web cam to get a face.

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