

Driver Drowsiness Alert System with OpenCV and Keras

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ABSTRACT

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The Driver Drowsiness Detection System which is made in the vision to prevent road setbacks because of the laziness or languor of the driver. around 20% of the road setbacks that are happened is a result of the sleepiness of the driver. This is positively not a little issue to be not regarded in a serious manner as it isn't only dangerous for the driver himself it is in like manner unsafe to his fellow voyagers and people who uses a comparative road.

In this paper we develop a model using OpenCV ,Keras and CNN algorithm which predicts if the driver is drowsy or not by capturing the eyes. If the eyes are shut for certain period then driver is alerted by sounding an alarm.

Keywords: OpenCV, Keras, CNN

I. INTRODUCTION

1.1 . PURPOSE:

1.1.1 PSYCHOLOGY OF HUMANS IN THE CONTEXT OF NEWDAY TECHNOLOGY:

People have long made procedures and strategies to make and safeguard their lives simpler and more secure, whether for unremarkable purposes like driving to work or more outlandish ones like flying. Portability modes advanced in lockstep with innovation enhancements, and our dependence on them rose decisively. It greatly has an impact our regular day to day existence. We can now go to places at speeds that our progenitors would never have imagined. Consistently, nearly everybody in the advanced world

purposes a transportation of some sort. Certain individuals can manage the cost of vehicles, while others should depend on open transportation. People who drive, paying little heed to societal position, are dependent upon specific standards and standards of lead. One of them is remaining ready and dynamic while driving.

Consequently, to give information and one more point of view on the main pressing issue, to work on their executions and to additionally advance the arrangement, this venture has been finished.

1.1.2 FACTS & STATISTICS

Our continuous estimations reveal that basically in 2015 in India alone, 148,707 people kicked the can on account of vehicle related accidents. Of these,

somewhere near 21% were caused in light of fatigue causing drivers to commit mistakes. This can be a decently more unobtrusive much number, as among the various causes that can prompt a disaster, the commitment of depletion as an explanation is overall horribly underestimated. Shortcoming got together with horrible establishment in arising countries like India is a disaster in the works. Depletion, when in doubt, is certainly difficult to measure or notice not at all like alcohol and drugs, which have clear key markers and tests that are open easily. Apparently, the most appropriate solutions for this issue are care about depletion related incidents and hoisting drivers to yield fatigue when required. The past is hard and significantly more expensive to achieve, and the last choice isn't possible without the past as driving for expanded timeframes is incredibly fulfilling.

Right when there is an extended necessity for an errand, the wages related with it fabricates provoking a consistently expanding number of people taking on it. Such is what is happening for driving vehicle vehicles around night time. Cash impels drivers to settle on impulsive decisions like driving the whole night even with shortcoming. This is prevalently since the drivers are not themselves aware of the tremendous bet related with driving when depleted. A couple of countries have constrained impediments on the amount of hours a driver can drive at a stretch, yet it is at this point insufficient to handle this issue as its execution is irrefutably testing and costly.

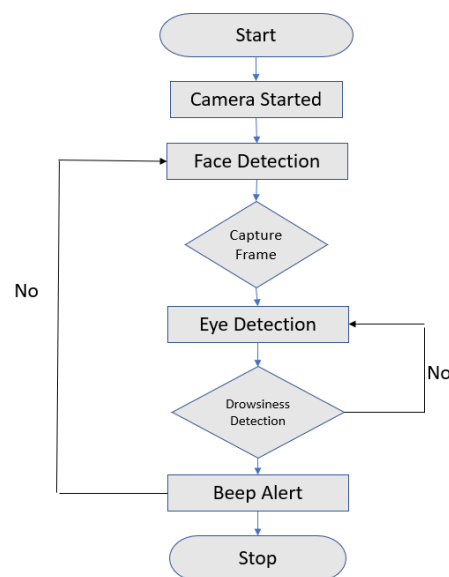
1.2 SCOPE:

There are different things out there that give the degree of depletion level in the drivers which are finished in different vehicles. The driver lethargy conspicuous evidence framework furnishes the comparative handiness yet with additional created results and extra advantages. Essentially, it makes the client on coming aware of a specific soaking point of the sluggishness measure.

1.3 PROBLEM STATEMENT:

Exhaustion is a security issue that has not yet been significantly taken care of by any country in the world on a very basic level considering its disposition. Shortcoming, when in doubt, is very difficult to evaluate or see not at all like alcohol and drugs, which have clear key pointers and tests that are available easily. In all likelihood, magnificent responses for this issue are care about shortcoming related setbacks moreover, lifting drivers to yield shortcoming when required. The past is hard besides, altogether more exorbitant to achieve, and the last choice is ridiculous without the past as driving for expanded periods is especially fulfilling.

SYSTEM ARCHITECTURE



II. METHODOLOGY

In The entire architecture is divided into 5 steps,

Stage 1 - Take picture as contribution from a camera.

Stage 2 - Identify the face in the image and make a Region of Interest (ROI).

Stage 3 - Identify the eyes from ROI and feed it to the classifier.

Stage 4 - Classifier will arrange whether eyes are open or closed.

Stage 5 - Work out score to check whether the individual is slow.

STEP 1:

We will utilize a webcam to catch photos as information. In this way, to get to the webcam, we made a boundless circle that catches each edge. We utilize the cv2 procedure presented by OpenCV. To get to the camera and set the catch object, use VideoCapture(0) (cap). Each casing is perused utilizing cap.read(), and the picture is saved in an edge variable.

STEP 2:

Face Detection:

This module uses video input from the camera to attempt to detect a face. The Haar Cascade calculation is utilized to distinguish the face. The Frontal face cascade classifier is one of the most common classifiers. A person's face is recognised in a photograph rectangular format, which was then transformed to a grayscale image. This information can be utilised to train the model.

Haar Cascade:

Haar Cascade relies upon the possibility of components which are proposed by Paul Viola and Michael Jones in their paper "Quick Object Detection utilizing a Boosted Cascade of Simple Features" in 2001.

It's an AI approach in which an outpouring capability is mastered utilizing countless positive and negative photographs. Identifying objects from a picture or a video can be utilized.

This algorithm comprises of three stages:

- i. Haar Feature Selection
- ii. Creating Integral Images
- iii. Cascading Classifiers

However Haar Cascade is utilized for recognizing practically all articles, it is famous for identifying faces in pictures. This calculation builds "areas of strength for a" as a direct mix of weighted basic "feeble" classifiers.

A Haar highlight assesses adjoining rectangular segments in a discovery window at one point, adds the forces of the pixels in every district, and figures the

distinction between these totals. During the location stage target-size window is hauled over the information picture, and for each Haar highlights are determined on a subset of the picture. This qualification is then in contrast with a prepared limit that recognizes non-endlessly protests Because Each Haar highlight is just a "powerless classifier," implying that it has a low location quality.

It is superior to speculating about irregular, and countless Haar qualities are required. They can precisely portray an item and, subsequently, they are to build major areas of strength for a, the information is gathered into overflow classifiers.

Haar-like components are picture incorporates that are used in object affirmation. They were utilized in the main continuous face identifier and got their name from their natural similitude to Haar wavelets. A Haar-like part contemplates coterminous rectangular districts in a revelation window at a specific region, totals the pixel powers in each district, and figures the qualification between these totals. This differentiation is then used to characterize picture subsections. For instance, while taking a gander at a human face, it is normal to see that the locale of eyes is a lot of dim than the district of the cheeks.

A typical Haar include for face recognition is a couple of two contiguous square shapes over the eye furthermore, the cheek area. These square shapes' positions are characterized corresponding to a recognition window, which fills in as a bouncing box for the objective item.



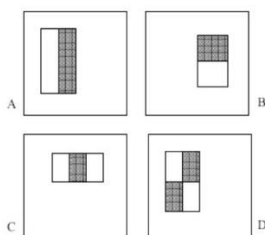
STEP 3:

Eye Detection:

Because the model is working on developing a drowsiness detection system, we must concentrate on the eyes in order to identify drowsiness. The eyeballs are recognised using video input and a haar classifier called *Haar Cascade Eye Classifier* is used. Rectangular format is used to detect the eyeballs.

VIOLA-JONES DETECTION ALGORITHM:

The article discovery structure Viola-Jones can be utilized to distinguish an assortment of item classes, however it is more centered around the identification of face and facial highlights. This calculation utilizes the idea of square shape highlights which includes the amounts of pixels inside the rectangular regions. From Figure XXXXXX, the amounts of the pixels that exist in the white square shapes are deducted from the amount of pixels in the dark square shapes. The worth of a two-square shape highlight, which are addressed by A and B is the distinction in the all out of pixels between two rectangular segments. The segments have a similar size and shape. They are likewise evenly or in an upward direction situated and contiguous one another. A three-square shape highlight, which is addressed as C, figures the total inside two external square shapes deducted from the aggregate in a middle square shape. At last, a four-square shape include, which is addressed as D registers the contrast between inclining sets of square shapes.

**STEP 4:****Convolution Neural Networks (CNN):**

The convolutional Neural Network CNN works by getting a picture, giving out it some weightage thinking about the various objects of the picture, and sometime later segregating them from one another. CNN requires very little pre-process information when wandered from other huge learning assessments. One of the urgent limits of CNN is that it applies mess methods for setting up its classifiers, which makes it sufficient to become familiar with the attributes of the objective article.

CNN depends on closely resembling design, as tracked down in the neurons of the human cerebrum, explicitly the Visual Cortex. Every one of the neurons gives a reaction to a specific boost in a particular locale of the visual region distinguished as the Receptive field. These assortments cross-over to contain the entire visual region.

CNN calculation depends on different modules that are organized in a particular work process that are recorded as follows:

- Input Image
- Convolution Layer (Kernel)
- Pooling Layer
- Characterization — Fully Connected Layer
- Structures

STEP 5:

The score is basically a worth that will be utilized to decide how long the individual has shut his eyes. Thus, on the off chance that the two eyes are shut, the score increments; assuming the two eyes are open, the score diminishes. We draw the outcome on the screen utilizing the cv2.putText() capability, which will show the individual's present status.

A limit is characterized, for instance, on the off chance that the score surpasses 15, it demonstrates that the individual's eyelids have been shut for a drawn out measure of time. This is the point at which we utilize sound to set off caution utilizing sound.play().

III. IMPLEMENTATION

The inspiration driving testing is to track down bumbles. Testing is the pattern of endeavoring to track down every conceivable deficiency or weakness in a work thing. It gives a strategy for truly investigating the convenience of parts, subassemblies, social occasions as well as/a finished thing. It is the most normal approach to working on programming fully intent on ensuring that the item structure meets its necessities and client suppositions doesn't bomb in unsuitable manner.

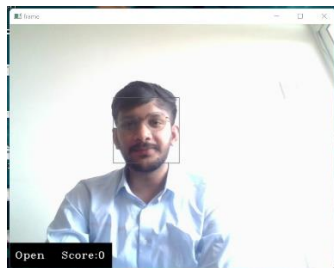


Fig no 1 Driver with spectacles

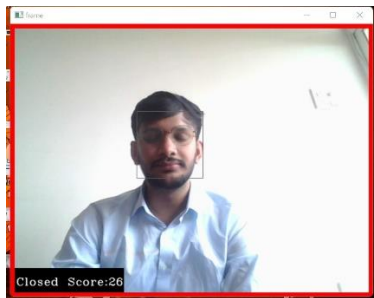


Fig no 2 Drowsiness Detected

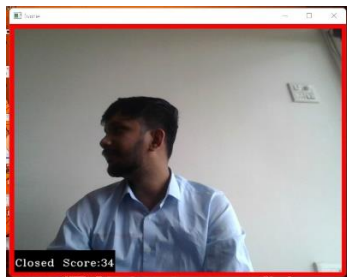


Fig no 3 Completely Distracted Driver

IV. CONCLUSION

It totally meets the goals and necessities of the framework. The structure has accomplished a resolute state where every one of the bugs have been discarded.

The structure mindful clients who are know all about the system and appreciate it's central focuses and the way that it deals with the issue of worrying for people having weariness related issues to illuminate them about the sluggishness level while driving. This framework can be utilized to lessen how much street mishaps that happens to extraordinary extent. This can save a ton of lives which is fundamental intention of the system. Taking realities into thought driver sluggishness ready framework is fate of street security.

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