

Drowsiness Detection System

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ABSTRACT:

A computer vision based thoughts have been used for the creation of a Drowsy Driver Detection System. The little camera has been utilized by framework that concentrates straight towards the essence of driver and checks the driver's eyes with a particular ultimate objective to perceive weakness. A notice sign is issued to alert the driver, in such circumstance when exhaustion is perceived. The framework oversees using information picked up for the picture to find the facial tourist spots, which gets the area where the eyes of an individual may exist. On the off chance that the eyes of driver are discovered close for a specific measure of casings, the proposed framework accept that the driver is falling asleep and an alarm of caution has been issued. The structure can work just when the eyes are found, and works in encompassing lighting conditions too.

Keywords —**K-Means Algorithm,Navie Bayes algorithm, Open CV,Face Detector Algorithms.**

I. INTRODUCTION

This document is a template. Driver exhaustion is a noteworthy factor in countless mishaps. Late measurements gauge that yearly 1,200 passing and 76,000 wounds can be credited to fatigue related crashes. Driver drowsiness and fatigue is a major factor which results into numerous vehicle accidents. Developing and maintaining technologies which can efficiently detect or prevent drowsiness at the wheel and alert the driver before am mishap is a major challenge in the field of accident prevention systems. Because of the dangerous that drowsiness can cause on the roads some methods need to be developed for preventing counteracting its effects. With the advent of modern 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 monitoring the eyes, it is believed that the symptoms of driver fatigue can be detected early enough to avoid a car accident. Detection of fatigue involves the observation of eye movements and blink patterns in a sequence of images of a face. Designing a prototype Drowsiness Detection System which will focus on continuously and accurately monitoring the state of the driver's eyes in real time to check whether they are open or closed for more than a given period of time .Driver drowsiness detection is a car safety technology which spares the life of the driver by avoiding mishaps when the driver is

getting languid. The primary goal is to initially plan a framework to distinguish driver's sluggishness by persistently checking retina of the eye. The framework works disregarding driver wearing displays and in different lighting conditions. To caution the driver on the identification of laziness by utilizing ringer or alert. Speed of the vehicle can be reduced. Traffic management can be maintained by reducing the accidents.

II. LITERATURE SURVEY

This part presents the literature survey of drowsiness detection approaches. According to the Survey on Driver Fatigue-Drowsiness Detection System, the detection system includes the processes of face image extraction, yawning tendency, blink of eyes detection, eye area extraction etc.

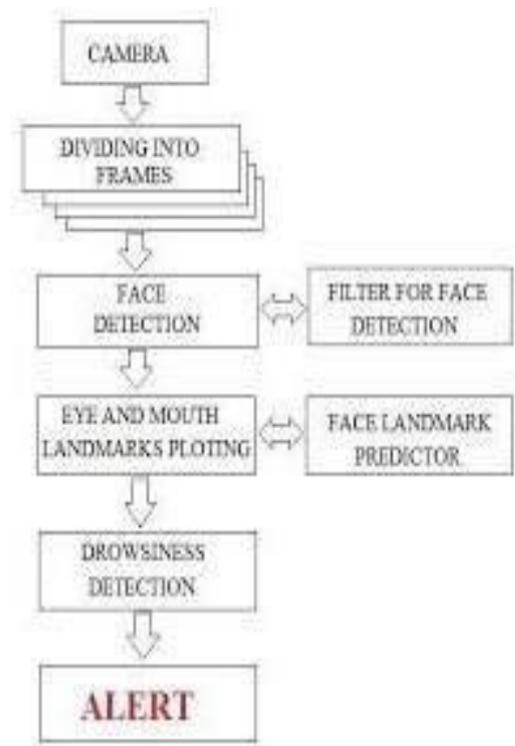
There are many experiments done with OpenCv for android also which is available for cheap smartphones as well. Other experiments conducted have resulted in utmost accuracy when camera was placed at different locations. Open Cv is predominantly a technique for real time image processing which has free of cost implementations on latest computer vision algorithms. It has all required computer vision algorithms.

Through analysis bestowed during this paper, we have a tendency to developed associate nonintrusive image laptop vision framework for timespan checking of a driver's cautiousness. To begin with, the obligatory equipment and imaging calculations square measure created to at the same time remove various viewable signs that for the most part describe an individual's dimension of weariness. At that point, a probabilistic structure is developed to demonstrate weakness, that reliably joins totally extraordinary obvious signals and in this manner the applicable talk data to supply a tough and steady weariness file. The most pieces of the framework incorporate an equipment framework for the timeframe obtaining of video photos of the main impetus and differed PC vision calculations and their PC.

Validation of this study has 2 parts in it. The first one involved the accuracy (of the computer vision algorithms / techniques) validation. Then the second involved the validation of the fatigue parameters that were computed in defining the extent of the fatigue.

The outcomes of the study showed that the prototype is efficient, dependable and accurate as well in detecting the drowsiness of the driver. All this was done in real- time and represents non-intrusive fatigue monitoring.

In another study which they tried developing similar fatigue detection system, the algorithm they proposed was designed to get the facial parts that include eyes and lips. For reducing the search areas in the provided input images, the algorithm extract the skin pixels as well which tells a lot about the possibilities that what all an algorithm can include in order to compute the drowsiness of the driver.

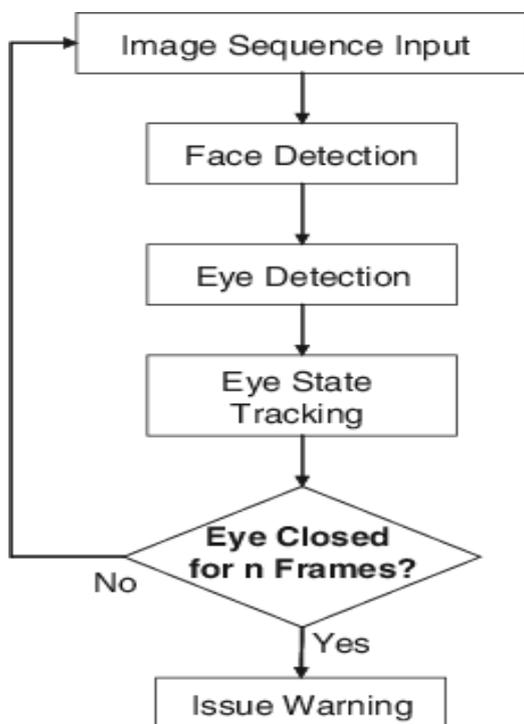


1. OPENCV

OpenCV is an open source computer vision library accessible in python coding language to code for visionary capabilities 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], you can purchase Intel's Integrated Performance Primitives (IPP) libraries [IPP]. These comprise of low-level schedules in different algorithmic regions which are streamlined. OpenCV consequently utilizes the IPP library, at runtime if that library is introduced.

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.

3.The Origin of OpenCV

OpenCV left an Intel Research action proposed to drive CPU-raised applications. Toward this end, Intel moved various endeavors that included constant beam following and moreover 3D show dividers. One of the product engineers working for Intel at the time was visiting schools. He saw that several top school social affairs, like the MIT Media Lab, used to have well-made similarly as inside open PC vision frameworks—code which was supplied starting with one understudy then onto the next and which gave each resulting understudy an important establishment while building up his own vision application. Rather than rehashing the fundamental capacities from starting, another understudy may begin by adding to that which preceded .

4.OpenCV Structure and Content

OpenCV left an Intel Research movement planned to drive CPU-raised applications. Toward this end, Intel pushed various endeavors that included continuous beam following and moreover 3D show dividers. One of the product engineers working for Intel at the time was visiting schools. He saw that two or three top school social events, like the MIT Media Lab, used to have well-made similarly as inside open PC vision foundations.

III.METHODOLOGY

1. OPENCV'S MACHINE LEARNING ALGORITHMS

The ML calculations that are incorporated into OpenCV are given as pursues. Every one of the calculations are available in the ML library separated from Mahalanobis and K-implies, which are available in CVCORE, and the calculation of face recognition, which is available in CV.

2. MAHALANOBIS:

It is a measure of distance that is responsible for the stretchiness of the data. We can divide out the covariance of the given data to find this out. In case of the covariance being the identity matrix (i.e. identical variance), this measure will be identical to the Euclidean distance.

3. K-MEANS ALGORITHM

It is an unsupervised clustering algorithm which signifies a distribution of data w.r.t. K centers, K being chosen by the coder. The difference between K-means and expectation maximization is that in K-means the centers aren't Gaussian. Also the clusters formed look somewhat like soap bubbles, as centers compete to occupy the closest data points. All these cluster areas are usually used as a form of sparse histogram bin for representing the data.

4. NORMAL OR NAÏVE BAYES ALGORITHM

It is a generative classifier where features are often assumed to be of Gaussian distribution and also statistically independent from one another. This assumption is usually false. That's why it's usually known as A—naïve Bayes classifier. That said, this method usually works surprisingly well.

5. DECISION TREES ALGORITHM

It is a partially discriminative classifier. The tree we talk about just finds a singular data feature and determines a threshold value of the current node which best divides the data into different classes. The data is broken into parts and the procedure is recursively repeated through the left as well as the right branches of the decision tree. Even if it is not the top performer, it's usually the first thing we try as it is fast and has a very high functionality.

6. BOOSTING

It is a discriminative group of classifiers. In boosting, the final classification decision is made by taking into account the combined weighted classification decisions of the group of classifiers.

We learn in training the group of classifiers one after the other. Each classifier present in the group is called a weak classifier. These weak classifiers are usually composed of single-variable decision trees known as —stumps. Learning its classification decisions from the given data and also learning a weight for its vote based on its accuracy on the data are things the decision tree learns during training. While each classifier is trained one after the other, the data points are re-weighted to make more attention be paid to the data points in which errors were made. This continues until the net error over the entire data set, obtained from the combined weighted vote of all the decision trees present, falls below a certain threshold. This algorithm is usually effective when a very large quantity.

7. RANDOM TREES ALGORITHM

It is a discriminative woods of a great deal of choice trees, every one of which is worked down to a maximal part profundity. At the season of adapting, each hub of each tree is permitted a decision of part factors, however just from an arbitrarily produced subset of the considerable number of information highlights. This makes sure that all the trees become statistically independent and a decision maker. In the run mode, all the trees get an unweighted vote. Random trees are usually quite effective. They can also perform regression by taking the average of the output numbers from every tree. [4]

8. FACE DETECTOR ALGORITHM

It is an object detection application. It is based on a smart use of boosting. A trained frontal face detector is available with the OpenCV distribution. This works remarkably well. We can train the algorithm for other objects by using the software provided. This works wonderfully for rigid objects with characteristic views.

9. EXPECTATION MAXIMIZATION (EM) ALGORITHM

It is used for clustering. It is a generative unsupervised algorithm It fits N multidimensional

Gaussians to the data, N being chosen by the user. It can act as an efficient way for representing a more complex distribution using only a few parameters (i.e. means and variances).

IV. CONCLUSION

Thus we would have successfully designed and developed partial implementation of the Driver Drowsiness Detector using Python and OpenCv along with the a cam to detect the face. The system to be developed is to be tested and limitations are identified. The rest of the work will be done according to what is planned already.

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