Detection System for Driver Drowsines

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Abstract: We suggest reducing the number of accidents brought on by driver fatigue and enhancing road success in the process. The modified disclosure of driver sluggishness is addressed in this structure susceptible to visual information as well as artificial awareness. For the purpose of using Softmax to quantify PERCLOS (level of eye end), we find, follow, and investigate the driver's face and eyes. The same way, alcohol and beat acknowledgment are used to determine whether a person is normal or abnormal. Due to postponed driving periods and weakness in added circumstances, driver fatigue is one of the major causes of auto accidents, especially for drivers of large vehicles (like transports and powerful trucks. This approach can be interpreted as a low-cost, dependable means to reduce the number of accidents caused by drowsy driving and thereby enhance travel safety.

Keywords: Raspberry Pi, Eye tracking, Driver, Image Processing

INTRODUCTION

One of the major factors contributing to auto mishaps is drivers' propensity for dozing off. According to statistics from different countries, about 20% of traffic-related injuries are the result of crashes that arise from drivers who are asleep at the wheel. It is obvious that this risk of drivers nodding off while operating a vehicle plays a significant role in the number of deaths in traffic accidents. The major causes of this risky behaviour are drinking alcohol, being tired while driving, and driving carelessly. Drivers' proclivity for falling asleep behind the wheel is one of the main causes of car accidents. According to data from various nations, accidents caused by drivers who are asleep at the wheel account for 20% of injuries caused by traffic. It is clear that the danger of drivers falling asleep at the wheel contributes significantly to the number of fatalities in traffic incidents. The main contributors to this risky activity are drinking, driving while fatigued, and careless driving. There are numerous methods that can be used to identify drivers who are sleepy. The efficacy of driving itself, eye response, critical biological parameters, and sleepiness can all be measured. Among these, biological tracking and eye response are the more trustworthy measurement techniques. However,

Using probes and direct physical measurement, which has limited applicability, is required for measuring biological parameters. The advantage of doing this measurement is that it is absolutely non-disturbing and doesn't require a probe or physical contact with the driver. The monitoring of eye closure patterns is the most effective method for identifying driver indolence since it is free from interference, disturbance, attachment of probes, and difficulty in use. An algorithm that correlates the pattern of eye closure with data on eye closure can be used to determine whether a driver is sleepy or not while engaged in active driving or when taking breaks.

RELATED WORK

The software for smart vehicles has undergone a lot of recent progress. Research in the area is being conducted as a result of the numerous accidents caused by driver fatigue. An ensemble deep learning architecture that considers the driver's fitness in addition to his or her eyes, lips, and other sensory data has been proposed in various research articles. [1] Several works also make use of facial feature extraction and eye retina detection. [2] The major objective of all of these initiatives is the prevention of driver sleepiness. The two main factors that contribute to driver drowsiness—fatigue and alcohol use—can all be avoided with the use of technology, particularly artificial intelligence. Artificial intelligence has also been utilized in the past to gauge how quickly a motorist is falling asleep. [3]

The necessity for the suggested system stems from other, more intrusive methods of preventing driver indolence, which make for an uncomfortably uncomfortable driving experience. For the purpose of detecting driver fatigue, EEG has been used. Here, several operations are carried out on the raw EEG. [4]

PROPOSED METHODOLOGY

The flowchart that can swiftly examine the data and determine whether a driver is sleepy is shown below. There are two counts: the number of frames with open eyes and the number of frames with closed eyes. An alarm is issued on the screen warning of driver fatigue if the number of frames with the eyes closed reaches a predetermined threshold.

Even if the driver is wearing glasses or the interior lighting is low, the tiredness detection gadget can still be used. The implementation of the flowchart in conjunction with the Open CV technology has made the detection reliable. The driver's frame is first captured in this process. Next comes the recognition of the face, and then the recognition of the eye. The total amount of frames The state of the eyes is kept under observation. It is assumed that the driver is not tired if the number of frames for which the eye state is closed is Drowsy Eyes 4. On the other hand, if the driver's eyelids are closed for more than four consecutive frames, it is assumed that they are asleep. This frame counting and collection is linked to a monitor and buzzer, which sound a warning when the driver appears to be nodding off..

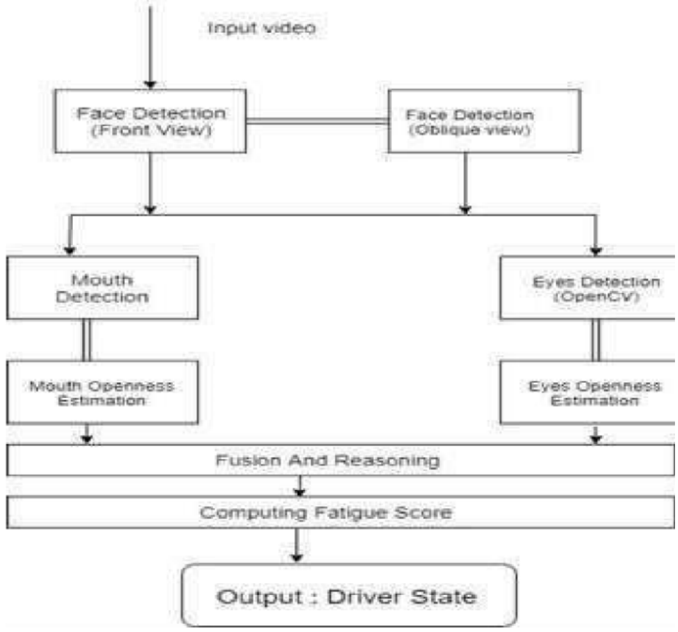


Fig -1: **flow chart**

IDENTIFICATION OF FACE

The first step of the suggested technique would be the one-by-one capture of the video frames. For Live Video broadcasting, OpenCV provides sufficient assistance. Every frame in the frame picture has a face that the device can recognize. The Viola-Jones object detector, a machine learning approach to visual object recognition, is used by this gadget. Images of the face are found using the Haar algorithm. The Haar algorithm has the ability to eliminate candidates who are not faces via phases cascade applications. As a result, a Haar attribute classifier classifies each attribute separately at each step based on its many properties. Each photo's face is scanned and identified using the built-in OpenCV xml file "Haar cascade frontalface alt2.xml.". This file was produced using both positive and negative samples and has a number of aspect properties.

After the edge detection feature has processed the face frames, only the face remains for further processing after all other objects have been removed. In order for the Haar algorithm to work properly, the face must be in the camera's axis.

IDENTIFICATION OF EYE

The eye identification system tries to identify the driver's eyes once the driver's face has been identified by the face detection function. With the assumption that eyes are only present in the upper part of the face and from the top edge of the nose, locate the eye region after face detection. We identify this region of interest (ROI) by cropping the mouth and head. The quantity of processing needed can be determined by the area of interest, and processing can also be sped up to provide precise eyeballs.

The edge detection method that was employed for face identification is once more utilised for eye identification exclusively. ROI is used to identify the shape of the eyes, and the circular hough transformation is then applied to identify the shape of the eye. The Hough transform approach allows for broad boundary definitions that are unaffected by factors like image noise. Contrary to edge detectors, this.

IDENTIFICATION OF SLEEPY EYES

After obtaining the photos of the identified eyeballs, this technique counts the number of frames that have open eyes. The number of frames with the condition of the eyes can then be kept track of. The driver is not tired when the number of frames for which the eye condition is closed equals Drowsy Eyes 4. On the other hand, if the driver's eyelids are closed for more than four consecutive frames, it is assumed that they are asleep.

IDENTIFICATION OF DRIVER UNDER INFLUENCE OF ALCOHOL

The addition of an alcohol sensor has enabled the identification of alcohol odor as a preventative measure to one of the factors that contribute to driver fatigue. This also sets off an alarm as a warning of impending tiredness.

LITERATURE SURVEY

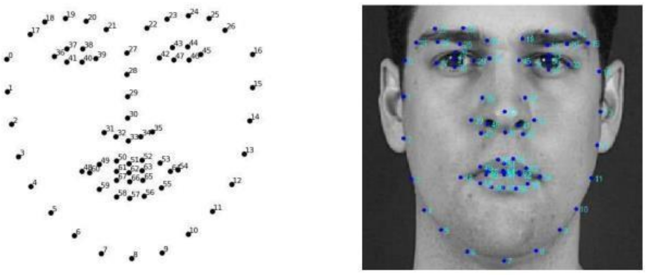
EYE BLINKING BASED TECHNIQUE: Drivers may quickly recognize tiredness because when they are feeling drowsy, their eye blinking and stare between the eyelids change from typical settings. This kind of technology collects video and computer vision using a remotely located camera. They simply took into consideration the coordination of eye blinking when developing this technique.

STEERING WHEEL MOVEMENT: It is a commonly used vehicle-based metric for determining the degree of driver drowsiness and is measured using a steering angle sensor. A steering column-mounted angle sensor is used to monitor the driver's steering behavior. When driving while sleepy, fewer micro-corrections are made to the steering wheel than when driving normally. The use of this technique is not appropriate for accurately identifying driver intoxication.

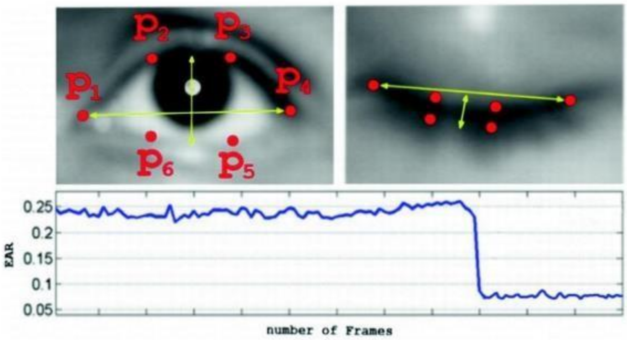
Smartwatch -Based Wearable EEG System for Driver Drowsiness Detection : This work created a wearable EEG device based on a smartwatch to detect driver tiredness using an SVM-based posterior probabilistic model. According to the suggested system, the driver drowsiness level might be changed from discrete to any probability value between 0 and 1. There is a need for more research into the use of EEG in conjunction with on-head motion sensors such as incorporating a gyroscope into the headbandconducted in order to add more context information to the EEG data and boost the detection accuracy.

IMPLEMENTATION

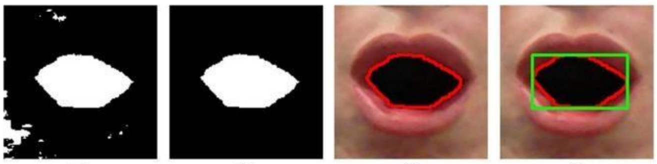
The steps listed below can be used to identify facial landmarks in an image. • Face detection: One of the earliest techniques for locating a human face and returning a value in x, y, w, and h that is a rectangle is face detection. Face landmark: We must place points inside a rectangle after determining where a face is located in an image. There are various face detector algorithms, but in this post we will only focus on Dlib's method. 2. Using the Dlib's 68-point facial landmark detector, the region of interest—eyes—have been found using this method. upper and lower lips. (After locating the eyeballs' coordinates, we discovered the eye's EAR, or eye aspect ratio.



EAR can be computed according to the position of eyes landmarks by: EAR = | P2 − P6 | + | P3 − P5| / 2 | P1 − P4 | where Pi ,i = 1, 2, . . ., 6 is the coordinate of eyes landmarks.



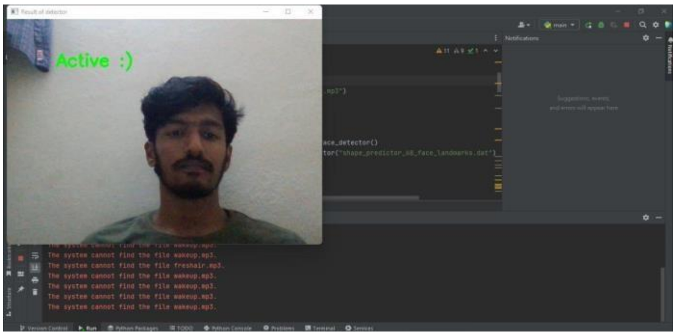
Calculate the Euclidean distance d =√[(x2 – x1) 2 + (y2 – y1) 2] between the upper lip and the lower lip to detect if the driver is yawning or not.



(a) (b) (c) (d)

MODULE 01 ACTIVATION MODULE:

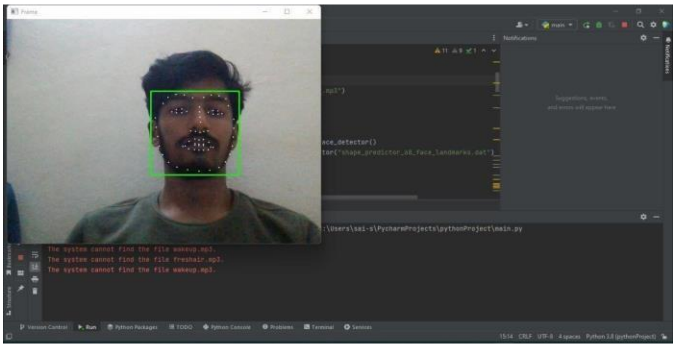
It displays a message indicating whether or not the camera is active.



MODULE 02

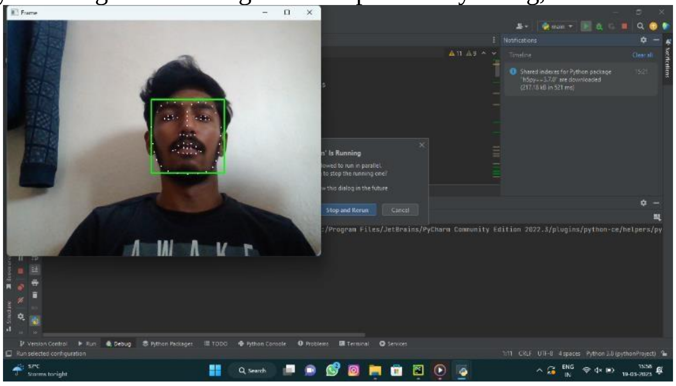
COORDINATE RECOGNITON:

It Locates the Coordinates In the human Faces In General Human as 68 Co-ordinates.



MODULE 03 YARN DETECTION:

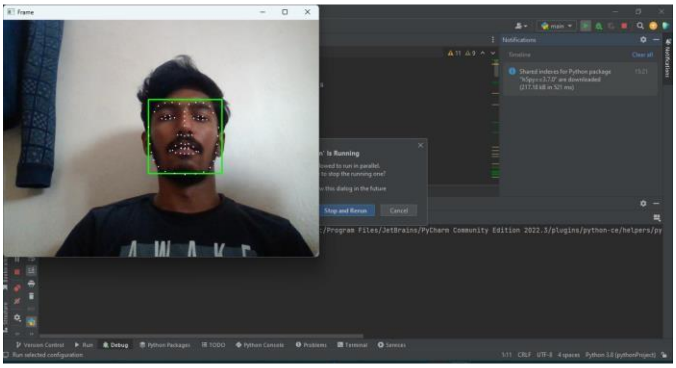
It captures the coordinates of the yarn and generates a signal that a person is yarning, and the buzzer blows.



MODULE 04

DROWSINESS DETECTION

The person's status is decided upon in the algorithm's final step based on a predetermined condition of sleepiness. A person's blinks typically last between 100 and 400 milliseconds (i.e. 0.1-0.4 of a second). His eye closure must be longer than this to indicate sleepiness. We chose a 5-second time frame. If the eyelids are closed for five seconds or longer, drowsiness is recognized, and a warning pop is produced..



CONCLUSION

Driver drowsiness is a major factor in the rise in fatalities and crashes on the road. In order to prevent these catastrophic collisions, important stakeholders must be alerted to the risk of an occurrence and driver inattention must be reliably identified. If the proposed technology is successful, it might become a regular component in vehicles when there is a chance that the driver will become drowsy. This or a similar system has the potential to greatly reduce the number of traffic accidents and related fatalities.

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