A Novel Approach on Intelligent Real Time Driver Sleeping Detection System using Viola Jones algorithm in Matlab Platform

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Abstract— *The attentiveness of the driver is essential to decrease the recent accident that occurs in the road. Many of time due to a lengthy tour, the drivers found to be exhausted and suffer from the difficulties of somnolent during the trip. Because of this driver requires making them warn when they suffer from this problem. In this work, a technique is detailed to monitor him throughout his journey. In this work, it is done on base of recognition of their eyes or their posture of body. A number of mechanisms previously devised for the detection of the somnolence of the driver. The technique is improved using MATLAB. This fashion consists of a sensing-element or capturing tool which will take the image and the take image would incessantly relay the siren. The default pattern has already deliberate sign and nourish as an allusion source so that the captured picture can be effortlessly coordinated with that allusion picture.*

Keywords— **Drowsy system, fatigue, template matching, street mischance, confront.**

1.INTRODUCTION

A few decades ago, the vehicles' mechanism was different, and it was different in control due to manual devices. But after the twentieth century, innovative changes took place, and day by day, the vehicles became more potent from the driving point of view. Since the technology to control the vehicles becomes mor`e stable. Most of the accidents happened due to the drowsiness of the driver, which leads to sleepiness. Their for it is basic to plan a framework that can distinguish the drivers languor ,laziness, and weariness. So that this increases curve of the accidents can reduced . The data of these accidents collected from the Ministry of Road and Transports. A Display driver drowsiness Warning system through which an order has discovered. A visual-based system is installed so that the monitor through visual is possible so that the driver's comprehensive monitoring can occur. The fatigue of the driver shows a negative impact on the capabilities to drive vehicles from the statistics from the govt. It has been analysed that from all the accidents, 50-60% are due to the drivers' drowsiness. From the statistics, it is found that annually almost 1200 to 1300 deaths occur due to drowsiness or distraction of the driver from the driving. Nowadays, it becomes essential for us to design the system to avoid this type of activity. These statistics can be reduced by the policies presented in this work, which are wholly based upon MATLAB. Driving is not an easy task, whether it is a very complex task because the entire driver should be alert and monitor the other vehicle driver activities. So that if any incident is going to occur due to laziness or due to any reasons for the distraction of the driver from the driving. By taking the correct decision or actions on time, that accident can be stopped since people give many clues when he/she is fatigued or tired. By detecting the signs of sleepiness, we can prevent future accidents while indicating the driver that the driver is no more in the condition of driving. This drowsiness occurs either due to distraction, due to alcohol or due to tension, etc. New technologies are designed which can detect those activities or capture the sign of the drowsiness. The human being body gives several symptoms which indicate that the person is fatigue or feeling sleepy, by identifying only those sign this alert system work and intimate the driver for it. There are two ways to discover this drowsiness of the driver, by capturing video of all the activities performed by the driver's and continue capturing of the image and comparing it with the reference image whatever is stored as a database in it. The term drowsy or sleepy is the same. Mostly the activities of the eye will include categories between the person who feels sleepy or who is not. The stages of rest can be separated and labeled as non-fast eye movement (NREM) and fast eye movement (REM) premise. The NREM defined by these three stages. The transition of awake state to sleep (Drowsy), Light sleep and deep sleep.([1],[2],[14])

1.1 Objective

The most objectives of this work is plan a framework which can totally dodge the street mischance. which happens due to tiredness languor or an weariness of the driver by ceaselessly watching on the pose. Facial expression or the development of the eyes.

1.2 Aim of the paper

The main aim of this paper is to protect the people from vehicle accidents. Mostly people have accident in sleeping condition. We try to design and develop a system which can track and recognize the sleeping expression from driver face. This system can be use in most extreme velocity vehicle like as car, truck and bus. We use viola

Jones algorithms for quick and effective discovery or resting condition of confront.

2.LITERATURE REVIEW

The Real-Time Cleverly Alert Framework [4] of Driver tiredness Based on Video Arrangements take action of the detection process by recording the Video Arrangements of the driver's and picture processing procedure. The problem with this method is First valley of histogram need not to be position of eyes always. Eye detection in a face image consuming linear and nonlinear filters . Estimate the size of eyes and separation of the eyes the problem with this method is, when the iris is shifted to either the right or left corner of the eye, only the opposite corner is detected. A Robust Algorithm for Eye Detection on Gray Intensity Face without Spectacles Presents a robust eye detection algorithm for gray intensity images. Storing template of eyes and matching with the existing templates. Detection accuracy is 95.2%. In addition, the average execution time of the algorithm approach is also quite efficient. Driver Drowsiness Detection Using Face Expression Recognition Proposes and implements a hardware system which is based on infrared light and can be used in resolving accidents due to drowsiness. Drowsiness Detection based on Eye Movement reduces the number of accidents, and therefore improves the worsening road conditions. The problem with this method, it can predict position by observing change in contrast, so cost effective. Object is highly sensitive to presence of even little other objects Analysts have been creating numerous strategies for driver's tiredness discovery utilizing computer vision strategies. In these inquires about weariness was identified by analyzing head developments, eyelid squinting and oscitancy[3]. Impediment of these set of computer instructions is that, they are subordinate on one figure as it were (yawning or eye squint or head development). In spite of the fact that a few analysts utilized combination of binary variables to make strides the exactness, be that as it make with the expanding rate of cars and car's mischance in each day's life, it is critical to alter, create and approved the existing work for weariness location. This investigate gives an set of computer instruction and recreation that combine to components (yawning and eyes status location) for weakness location[3]. Both viola jones and skin color pixel discovery is utilized for confront discovery to extend the precision of confront location. Besides, combination of information base division and viola jones mechanisms. Are utilized to extend the precision of front face element.([1],[3],[4],[5],[11]).

In this paper, we survey in many approaches for detection of face, eyes, hand and mouth. This previous technique is complex and depending upon biological system of human body. EEG collected the brain signal data for Head movement detection is described in. EOG also detect the eyes and forehead movement signal for drossy detection. These techniques are more complicated and wear a sensor based electrode on driver's head, face region.[15].

3.DROWSY DRIVER FATIGUE DETECTION APPROACHES

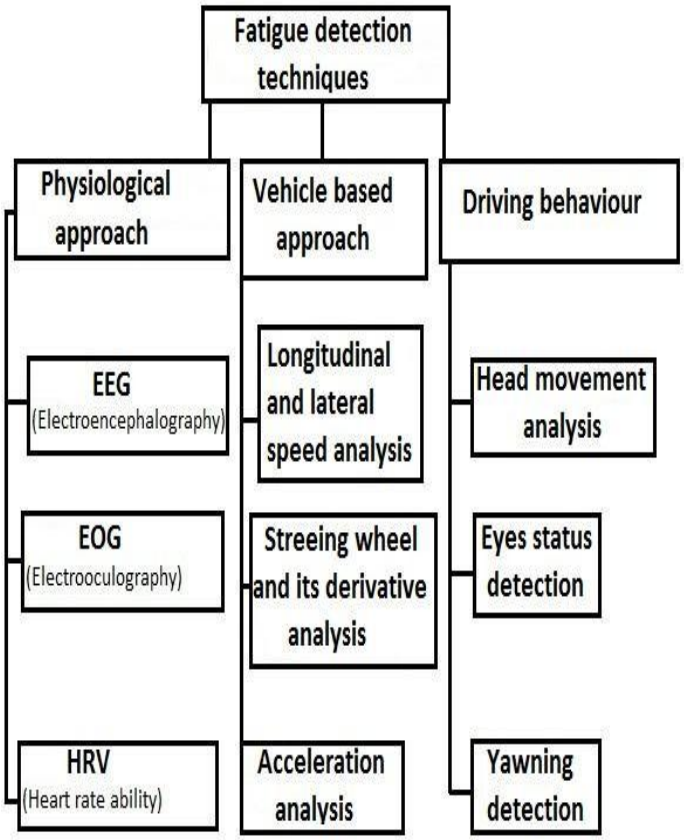

Fig1: Various approach of drowsy driver detection

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4.RELATED ALGORITHM

We use viola-Jones algorithm for detection of drowsy driver detection. It is based on machine learning approaches, where we can train many positive and negative images using cascade function. This algorithm is use to detect the object from the real time capture images and video. We need extract feature images from it Each of

features having a single esteem which is gotten by subtracting the entirety of pixels beneath custom rectangle from the entirety of pixels beneath dark rectangle.

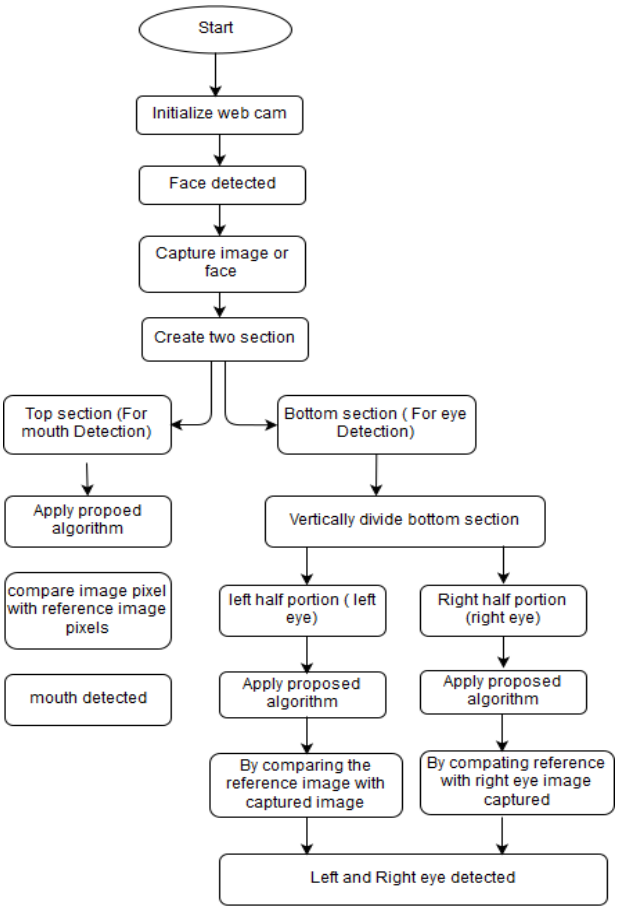

Fig2: Flow diagram of mouth and eye detection

The function of this proposed system contains various stages such as skin colour detection, face detection, mouth detection and eye detection etc. We will discuss all the blocks one by one to understand the complete process of detection of eye and mouth. The road accident due to drowsiness can be avoided. For the proper detection of the status of eye and mouth or the facial expression a web cam is installed with are the controlled by computer vision.

4.1Acquisition of images

This is the method of the obtaining picture from web cam or the camera whatever is introduced for the right checking of the confront After securing facial picture, preprocessing is performed.

4.2Face width detection

To identify the total width of the confront,horizontal examination of the picture take is done. Width are recognized on the premise of alte in pixel design and white pixels. Once this width is take the picture is isolated into two half depending upon these values of the pixels.

4.3Crop image

When the facial picture is take, the picture is trimmed between to segment based on the stature utilizing editing appratus. The primary segment contain the eyes fragments and the momet area contains mouth area .

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Fig3: Cropped captured image into two section

4.4Mouth detection

This area is recognized based on the arrange framwork which are required for the superior assignment of the all pixel reaction for the discovery of the mouth expression presently the blurb of mouth will be either open or near. Depending upon either these two positions of the mouth ,out algorithm will work.

4.4.1Mouth open

When mouth is opened. First of all, it is not necessary that if mouth is opened then the condition of sleepiness is present there. So continuous monitoringof the picturefashioned by this sector is done. The open condition of mouth is identified dimpliest the dark pixels in binary image will be huge in comparision to the mention outline.This contrast cannot be more than 6 percent of the pixels which is dark within theperfect outline.In the event that the mouth opens for continuous 2 seconds as per the outlines chosen, it implies the individual isyawning and in this case the reaction to caution the drive will be created.

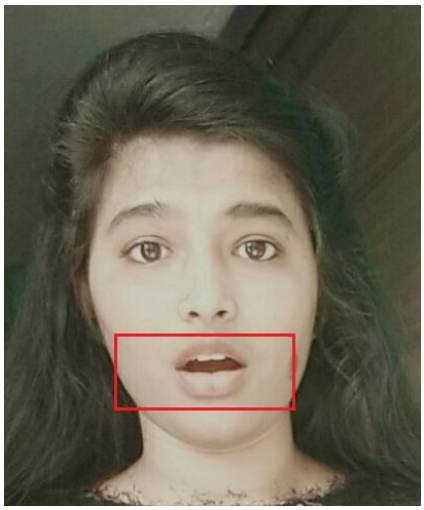

Fig4: Mouth open detection

4.5Position of Head detection

On the off chance that the head is brought down at that point the typical level, or band the number of pixels of the skin diminish as compare to the reference or perfect outline. On the off chance that head is found to be totally different bearings for at slightest 2 second, it implies the individual is leads towards mishap and the alarm caution will be generated.

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Fig5: Head Lowering Position

4.6 Preprocessing

The preprocessing operations defines the operation performed before the further examination of the face takes place like detecting eye, mouth and head. It includes the processing of a image captured to increase the processing speed as per the capacity of the memory and removal of noise. This method uses the techniques called compression and expansion of the image to perform the drowsiness detection. White pixels represent the actual portion of the face where as the black pixels represents noise present with the desired pixels. After digitization of the facial image, the procedure to remove noise is used which involves an expansion of image processing method, this is done with the help of the median filter. These preprocessing operations are enough to support the detection of the vertical positions of the eyes. The eye contraction is used when the eye come back to its actual position i.e. when the eye gets open.

4.7Eyes Detection

4.7.1Eye tracking

The high speed processing, to remove the processing of each frame to detect the position of eye from the captured image, to obtain this a new function is used. This function is used in such a manner that the actual position of the eye can be tracked by recognizing the area which becomes impossible to track without using this function. The eye tracking is a idea which defines the area of the facial image where eye search is made as per the central coordinated of the eye. This is necessary for this tracking system is to track the data from the captured image and compare it with the reference image. To track the actual position of the eye, by detecting the next frame so that actual information can be obtained. The degree of openness will decide the tracking of the eye whether it is correct or not. If the degree of openness of eye varies between the specified range. Similarly, if eye remains out of range which means it is not traced correctly. The region of eye will start from some initial points so to detect this points a coordinate system is required. Once the image is captured, at specific distance from the head and mouth the position of the eye are located. Let this distance is (0.5 * height of captured image) from the top and (0.25 * width of captured image) from the left. The size of window is (0.35 * height of image) in height and (0.58 * width of image) in width. Before detecting the eye, the conversion is done. The specified configuration represents a complete frame of the image which are capture and over which all the operations are need to be performed.

4.7.2Eyes Closed

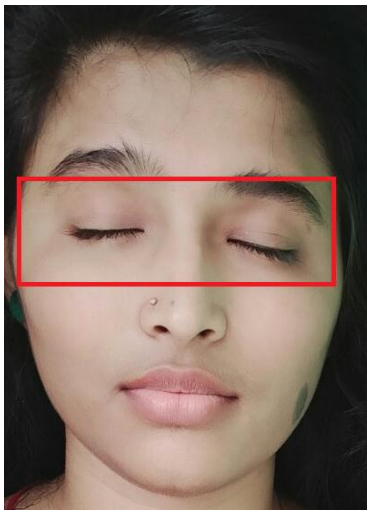

Fig6: closed eye position

The black pixels are detected when the eye is closed instead of getting white pixels. If the eye closed for 2 seconds the warning to the drivers produced and the alarm or buzzer will start so that the driver may know his position and stop the vehicles, to stop the accident which can be occurred if the driver will not stop the vehicle.

5.DISCUSSION

We survey many different techniques which is avoid the accident of vehicle such as EEG tracking, EOG, alcohol detection based avoiding system, Ultrasonic based obstacle avoidance. This technique is used to detect the real time face expression for sleeping condition. This method is fast and more efficient from the previous algorithm. We should to try this paper in practical hardware implementation.

6.Conclusion

It can be concluded that this proposed algorithm will help in reducing the number of accidents which occurs due to the drowsiness of the driver. This MATLAB based algorithm by detecting the facial expression of the driver will obtained the signal and send it to the buzzer, so that the future mishap's can be avoided. This algorithm will continuously check the facial expression of the driver. The driver face is captured by the camera first then the used method will extract the background and foreground classes for the extracted part of the face. The output of the camera will be processed in the embedded platform and the results of face and mouth tracking can be seen on the monitor that is connected to the system. By observing the eye and mouth state it will check for driver fatigue. Here we can observe that eye is opened and mouth is closed so there is no sign of fatigue will detect. Hence Alarm is not generated.

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