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DRIVER DROWSINESS MONITORING AND WARNING SYSTEM

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I. ABSTRACT

Driver Drowsiness monitoring and Warning System has been developed employing a non-intrusive machine vision based concepts. The system uses a touch monochrome security camera that points directly towards the driver's face and monitors the driver's eyes so on detect fatigue. In such a case when fatigue is detected, a alarm is issued to alert the drive . This report describes the thanks to find the eyes, and also the thanks to determine if the eyes are open or closed. The system deals with using information obtained for the binary version of the image to hunt out the edges of the face, which narrows the planet of where the eyes may exist. Once the face area is found, the eyes are found by computing the horizontal averages within the world. Taking under consideration the knowledge that eye regions within the face present great intensity changes, the eyes are located by finding the many intensity changes within the face. Once the eyes are identified, measuring the distances between the intensity changes within the eye area determine whether the eye s are open or closed an out sized distance corresponds to eye closure. If the system detects the eyes are found close for twenty consecutive frames, the system gives the conclusion that the driver is falling asleep and issues an alarm. The system is additionally able to detect when the eyes cannot be found, and works under reasonable lighting conditions.

INDEX TERMS: nap detection, capture processing, face identification

II INTRODUCTION

The Biggest problem regarding the increased use of vehicles is that the rising number of road accidents. Road accidents are undoubtedly a worldwide menace in our country. The frequency of road accidents in India is among the very best within the world. The fatalities, associated expenses and related dangers are recognized as serious threat to the country. of these factors led to the event of Intelligent Transportation Systems (ITS). ITS include driver assistance systems like Adaptive control, Pedestrian Detection Systems, Intelligent Headlights, Blind Spot Detection Systems, etc. Taking under consideration of those factors, the driver's state may be a major challenge for designing advanced driver assistance systems. Driver recklessness and carelessness are the reasons of most of the road accidents occurring nowadays. the main driver errors are caused by drowsiness, drunken and reckless behavior of the driving force . The resulted errors and mistakes may contribute much loss to the humanity. so as to attenuate the consequences of driver abnormalities, a system for abnormality monitoring has got to be inbuilt with the vehicle. the important time detection of those behavior may be a serious issue regarding the planning of advanced safety systems in automobiles.

III. LITRERATURE REVIEW

One of the common definitions of driver abnormality is: "Driver abnormality represents diminished attention to activities that are critical for safe driving within the absence of a competing activity." In-vehicle driving behavior detection may be a hot topic within the field of ITS. Several works are wiped out the sector of driver abnormality monitoring and detection systems using wide range of methods. Possible techniques for detecting drowsiness in drivers are often divided into sensing of physiological characteristics, driver operation, vehicle response and driver response [4]. Among these methods, the techniques that are the best supported accuracy are those supported human physiological phenomena [5]. this system are often implemented in several ways like measuring brain waves (EEG), pulse (ECG) and open/closed state of eyes [6]. The two primary methods being more accurate are not realistic since sensing electrodes to be attached directly onto driver's body. The technique supported eye closure is compatible for real world driving conditions, since it are often non intrusive by using cameras to detect the open/closed state of the eyes [7]. Eye tracking based drowsiness detection system has been done by analyzing the duration of eye closure using camera and developing an algorithm to detect the driving force drowsiness in advance and warn the driving force via in vehicle alarms.Though the research work had been started many years ago, only a couple of systems are commercially released. The drowsiness detection systems developed by Volvo and Mercedes Benz find their use only in high ranked vehicles. the eye Assist system in Mercedes Benz vehicles monitors the vehicle continuously, to adopt a practically oriented system towards accident avoidance.

IV PROPOSED SYSTEM

There are many different algorithms and methods for eye tracking, and monitoring. Most of them in some way relate to features of the attention within a video image of the driver. the main aim of this project was to use the retinal reflection as a way to finding the eyes on the face, then using the absence of this reflection as a process of detecting when the eyes are closed. Application of this algorithm on consecutive video frames may aid within the calculation of eye closure period. Eye closing period for drowsy drivers are longer than normal blinking. it's also little or no longer time could end in severe crash. So we'll warn the driver as soon as closed eye is detected.

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i)SENSING PLAN

Eye Camera is employed for sensing the eyes of the driving force .Alcohol sensor is employed for sensing the presence of alcohol content within the driver's breath. The accelerometer present on the vehicle suspension unit senses the downward acceleration of the vehicle toward the road humps and pits.

ii) DETECTION PHASE

The analysis of data from the sensors and camera are done to deduce the driver's current

drivingbehaviour style. The open/closed state of eyes is deduced by means of image processing techniques using computer vision. The image processing techniques are performed inside PC.

iii) CORRECTION PHASE

This phase is liable for doing the corrective actions required for that specific detected abnormalbehaviour. The corrective actions include in-vehicle alarms, turning of the engine and GSMcommunication with the authorities. The corrective measures vary consistent with the behavior detected. Corrections for drowsiness include in-vehicle alarms and its repetition turns the engine off.Drunkenbehaviour is rectified by in-vehicle alarms, if not GSM communication with the authorities are done. Reckless measures include in-vehicle alarms and repetition will close up the engine Certain issues related to the low cost execution of the proposed system with all its functionalities include the data fusion from different sensors and therefore the image processing techniques. Also the addition of more sensors and algorithms to enhance the accuracy and perfection of the system are going to be a challenge ahead of this work.

iv) SYSTEM PROCESS

(i) Eye detection function:

After igiving a facial image as input, pre-processing is first performed by binarization of the image. The highest and sides of the face are detected to narrow down the world of where the eyes exist. Using the edges of the face, the centre of the face is found, which can be used as a reference when comparing the left and right eyes. Moving down from the top of the face, horizontal averages (average intensity value for every y coordinate) of the face area are calculated. Large changes within the averages are wont to define the eye area. the subsequent explains the attention detection procedure within the order of the processing operations. All images were generated using the image processing toolbox

(ii)Binarization:

the primary step to localize the eyes is binarizing the image . Binarization means converting the image to a binary image. The background is uniformly black, and therefore the face is primary white.

(iii)Removal of Noise: The removal of noise within the binary image is extremely straightforward. The key to the present is to prevent at left and right fringe of the face; otherwise the information of where the sides of the face arewill be lost.

(iv) Finding Intensity Changes :

here we will find the intensity changes on the face which is a subsequent step in locating the eye . this is often done using the

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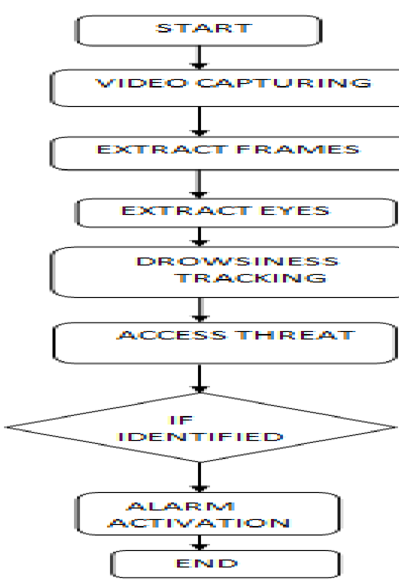
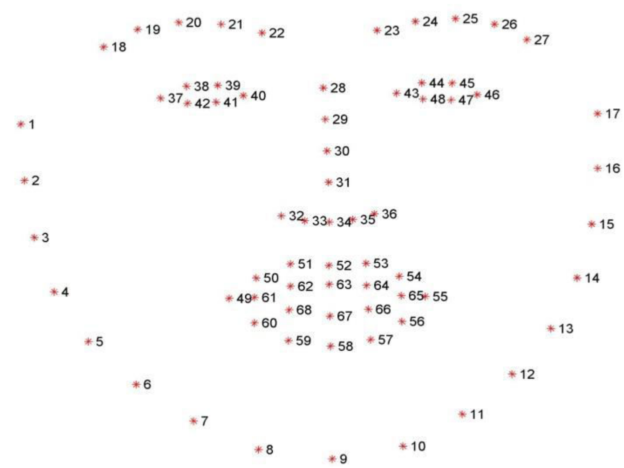
first image, not the binary image. the primary step is to calculate the average intensity for every y – coordinate. This is called the horizontal average, because the averages are taken among the horizontal values. The horizontal valleys (dips) in the plot indicate intensity changes. When the horizontal values were initially plotted, it had been found that there have been many small valleys, which don't represent intensity changes, but result from small differences within the averages. To correct this, a smoothing algorithm was implemented. The smoothing algorithm eliminated and little changes, leading to a more smooth, clean graph. After obtaining the horizontal average data, the next step is to seek out the foremost significant valleys, which can indicate the attention area.

FLOWCHART OF ALGORITHM IS REPRESENTED AS :



V. Detection of Vertical Eye Position

The first largest valley with rock bottom y – coordinate is the eyebrow, and therefore the second largest valley with subsequent lowest y-coordinate is that the eye. The areas of the right and left side are compared to check whether the eyes are found correctly. Calculating the left side means taking the averages from the left corner to the centre of the face, and similarly for the proper side of the face. the rationale for doing the 2 sides separately is because when the driver's head is tilted the horizontal averages aren't accurate. for instance if the top is tilted to the proper , the horizontal average of the eyebrow area are going to be of the left eyebrow, and possibly the proper hand side of the forehead.



Visualizing the 68 facial landmark coordinates

V. SIMULATION AND RESULT

A. DROWSINESS DETECTION FUNCTION

The state of the eyes (whether it's open or closed) is determined by distance between the primary two intensity changes found

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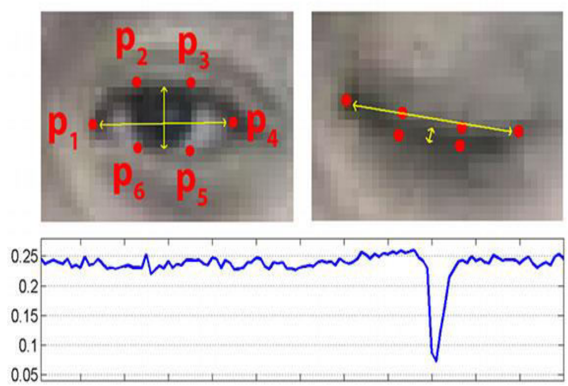
within the above step. When the eyes are closed, the space between the y – coordinates of the intensity changes is larger when it is compared to opened eyes The limitation to the present is that if the driving force moves their face closer to or beyond the camera. If this happens ,the distances will vary, since the amount of pixels the face takes up varies, as seen below. due to this limitation, the system developed assumes that the driver's face stays almost an equivalent distance from the camera in the least times.



B.JUDGING DROWSINESS

When there are few consecutive frames find the eye aspect ratio as closed, then the alarm is stimulated, and a driver is alerted to awaken . Consecutive number of closed frames is required to avoid including instances of eye closure.

VI CONCLUSION :

The driver abnormality monitoring system developed is capable of detecting somnolence, drunken and reckless behaviours of driver during a short time. The Drowsiness Detection System developed supported eye closure of the driving force can differentiate normal eye blink and drowsiness and detect the drowsiness while driving. The proposed system can prevent the accidents thanks to the sleepiness while driving. The system works well even just in case of drivers wearing spectacles and even under low light conditions if the camera delivers better output. Information about the eyes position is obtained through various image processing algorithms. During the monitoring, the system is in a position to make a decision if the eyes are opened or closed. When the eyes are closed for too long a alarm is issued. processing judges the driver's alertness level on the idea of continuous eye closures.

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