DRIVER DROWSINESS DETECTION AND ALARMING SYSTEM

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ABSTRACT

Nowadays, more and more professions require long-term concentration. Drivers must keep a close eye on the road, so they can react to sudden events immediately. Driver fatigue often becomes a direct cause of many traffic accidents. Therefore, there is a need to develop the systems that will detect and notify a driver of her/him bad psychophysical condition, which could significantly reduce the number of fatigue-related car accidents. However, the development of such systems encounters many difficulties related to fast and proper recognition of a driver's fatigue symptoms. One of the technical possibilities to implement driver drowsiness detection systems is to use the vision-based approach. This article presents the currently used driver drowsiness detection systems. Here we are detecting the driver drowsiness by estimating vision system of him .and once the driver is drowsy an alert message to send to the registered user

1 INTRODUCTION

Driver exhaustion is a significant variable in an expansive number of vehicle accidents. Late insights, assess that yearly 1,200 deaths and 76,000 injuries can be credited to weariness related accidents. Road Accidents in Sri Lanka cause financial losses worth around Rs.9.34 billion every year. It can be seen there are around 2,400 road accidents consistently which is one death per every four hours. It has been figured around 20% of car crashes with driver fatalities are due to driver's drowsiness. It was uncovered that driving execution quickly drop with expanded tiredness which result in making more than 20% of all vehicle accidents. Less attention heads the driver to being distracted and the likelihood of street accident goes high.

Drowsiness related accidents have all the earmarks of being more serious, because of the higher speeds involved distraction and the driver being not able to take any avoiding activity, or even brake, before the accident. The improvement of innovations for recognizing or preventing tiredness of the driver is a significant test in the field of accident preventing systems. Because of the danger that that drowsiness presents on the road, strategies need to be created for checking its influences. Loss of the awareness because of the tiredness causes a few changes in the human's body and activities.

These side effects and parameters empower us to effectively measure the drowsiness level. Different strategies for drowsiness identification can be partitioned into two general classifications. The techniques in the first gathering recognize the level of the

tiredness focused around the physiological changes in the body. Eye status, speech properties, time interval betweentwo yawning, head position, sitting carriage, heart rate, and brain signals are simply a couple of illustrations of the strategies in the first classification. Drowsiness additionally brings about somechanges in the driving style. Techniques in the second category estimate the driver's drowsiness level by following these progressions. Steering angle, distance from the following vehicle, lateralposition of the vehicle, longitudinal speed, longitudinal speeding up, and lane departure are utilized as a part of the technique of the second classification.

2.LITERATURE SURVEY AND RELATED WORK

Driver drowsiness in commercial truck drivers is a major concern and is responsible for thousands of accidents and fatalities every year. In a 1994 report (Knippling 1994), the Office of Crash Avoidance Research (OCAR) of the National Highway Traffic Safety Administration (NHTSA) identified driver drowsiness as one of the leading causes of single and multiple car accidents. NHTSA estimates that 100,000 crashes annually involvedriver fatigue resulting in more than 40,000 injuries.

Driver's drowsiness can be measured by two classes of phenomena: Physical and physiological and Vehicle state variables. Physical and physiological measurements include the measurement of brain wave or Electroencephalogram (EEG) (Acerated and Gulberg 1990; Huang, Kuo et al. 1996), eye activity (Skipper, Wierwille et al. 1984; Dingus, Hardee et al. 1985; Ueno, Kaneda et al. 1994; Ogawa and Shiromani 1997). PERCLOS (Percent eyelid Closure) is one of the most widely accepted measures in scientific literature for measurement and detection of drowsiness (Dinges, Mallis et al. 1998; Grace, Byrne et al. 1998).

Drowsiness detection systems have been developed which work based on measurement ofPhysical and physiological features, and can provide very good detection accuracy. However, they have some shortcomings. The problem with an EEG is that it requires the use of electrodes to be attached to the scalp and that makes it very impractical to use. Eyeclosure activity can also provide good detection accuracy, but capturing eye imageunobtrusively can be expensive and challenging under certain conditions.

Fatigue has been estimated in 15% of single vehicle fatal truck crashes (Wang and Knippling 1994) and is the most frequent contributor to crashes in which a truck driver is fatally injured (NTSB 1990). Based on NHTSA General Estimates System (GES) statistics (Knippling and Wierwille 1994), although the frequency of drowsiness related crashes involving passenger vehicles is greater than that of combination-unit trucks, the number ofinvolvements per vehicle life cycle for trucks is about 4 times greater due to their very high exposure level, as well as the greater likelihood of night driving. With respect to Vehicle State Variables Measurement, other approaches for detecting driver drowsiness are based on monitoring driver inputs or vehicle output variables duringdriving. These methods have the advantage of being non-intrusive to the drivers.

Robert Gabriel Lupu has discussed that in the previous year’s many algorithms for eye pupil/iris detection have been developed. Depending upon the source light point of view there are two approaches namely based on ambient or infrared light. All of them search forcharacteristics of the eye. There are some algorithms that search for features like blackestpixels in the image, pixels that correspond to pupil or iris and are known as feature-based algorithms.

Dongsheng Li, Derick J. Parkhurst has discussed that Starburst algorithm is a robust eye- tracking algorithm that combines feature-based and model-based approaches to achieve a good trade-off between run-time performance and accuracy for dark-pupil infrared imagery.

V. Starvation and D. Samal have discussed, Geometric feature learning methods extract distinctive geometric features from images. Geometric features are features of objects constructed by a set of geometric elements like points, lines, curves, or surfaces. These features can be corner features, edge features, Blobs, Ridges, salient points image texture and so on, which can be detected by feature detection methods

3 Implementation Study And PROPOSED WORK AND ALGORITHM

Analysis of the Existing system, helps in designing problem statement of Proposed system. In the following section based on the analysis of existing system, the requirements of proposed system have been defined.

Existing System

SVM (support vector machine) was used to classify the components in the input video. While cropping the region of interest components in the video is not accurate. Sometimes it will show regions wrong. To sense the eyes first we must create boundary boxes for that and a classification algorithm. The algorithm of SVM will not support.

By using a non-intrusive machine vision-based concepts, drowsiness of the driver detected system is developed. Many existing systems require a camera which is installed in front of driver. It points straight towards the face of the driver and monitors the driver's eyes in order to identify the drowsiness. For large vehicle such as heavy trucks and buses this arrangement is not pertinent. Bus has a large front glass window to have a broad view for safe driving. If we place a camera on the window of front glass, the camera blocks the frontal view of driver so it is not practical. If the camera is placed on the frame which is just about the window, then the camera is unable to detain the anterior view of the face of the driver correctly.

The open CV detector detects only 40% of face of driver in normal driving position in video recording of 10 minutes.

In the oblique view, the Open CV eye detector (CV-ED) frequently fails to trace the pair of eyes. If the eyes are closed for five successive frames the system concludes that the driver is declining slumbering and issues a warning signal. Hence existing system is not applicable for large vehicles. In order to conquer the problem of existing system, new detection system is developed in this project work.

3.1 PROPOSED SYSTEM:

The proposed method aims to classify frames in videos based on special facial features learnt via convolutional neural network gives an overview of the training and testing procedure adopted in the scheme. Firstly, frames are extracted from the video. These frames are fed to a Viola and Jones Haar-like features based face detector. Once the classifier has been trained, the rest twenty percent of the images extracted earlier are tested on the trained classifier.

The above scheme describes drowsy driver detection at the frame level. A binary signal for each frame in the form of drowsy or non-drowsy face is been obtained. For an alert signal to be delivered to a driver, at least 40 out of 60 frames should be detected as drowsy. A buffer of 60 recent frame outputs is maintained and a warning is sent to the driver in the form of an alerting sound. Thus, the driver is being successfully alerted and assisted by the intelligent system based on non- intrusive vision scheme.

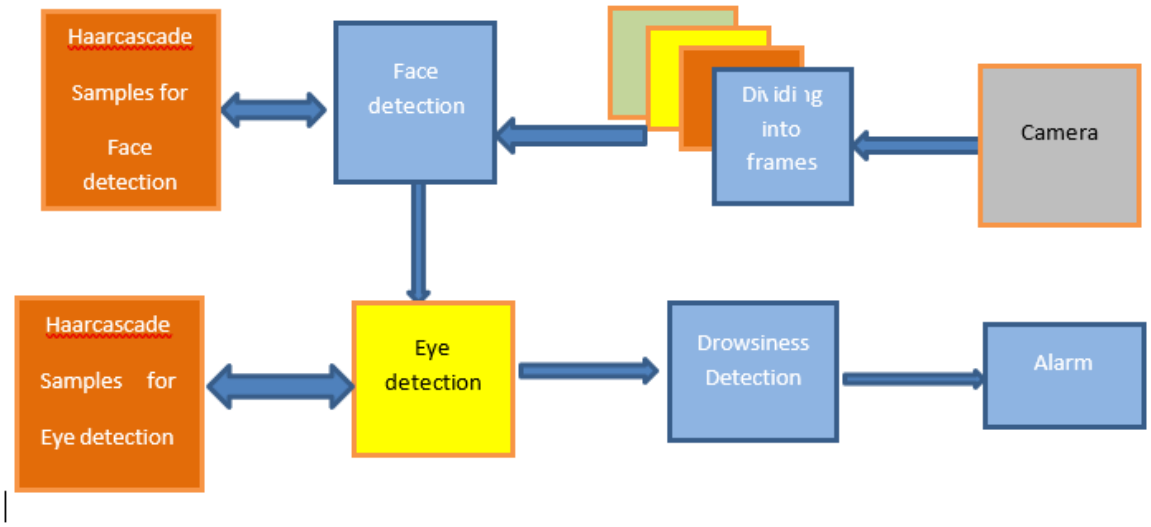

Fig1: - Flow chart showing entire process of drowsiness detection system

4.RESULTSANDDISCUSSION SCREENSHOTS

Fig 2:- checks for the eye and if the eye is closed it checks for drowsiness for every 20seconds

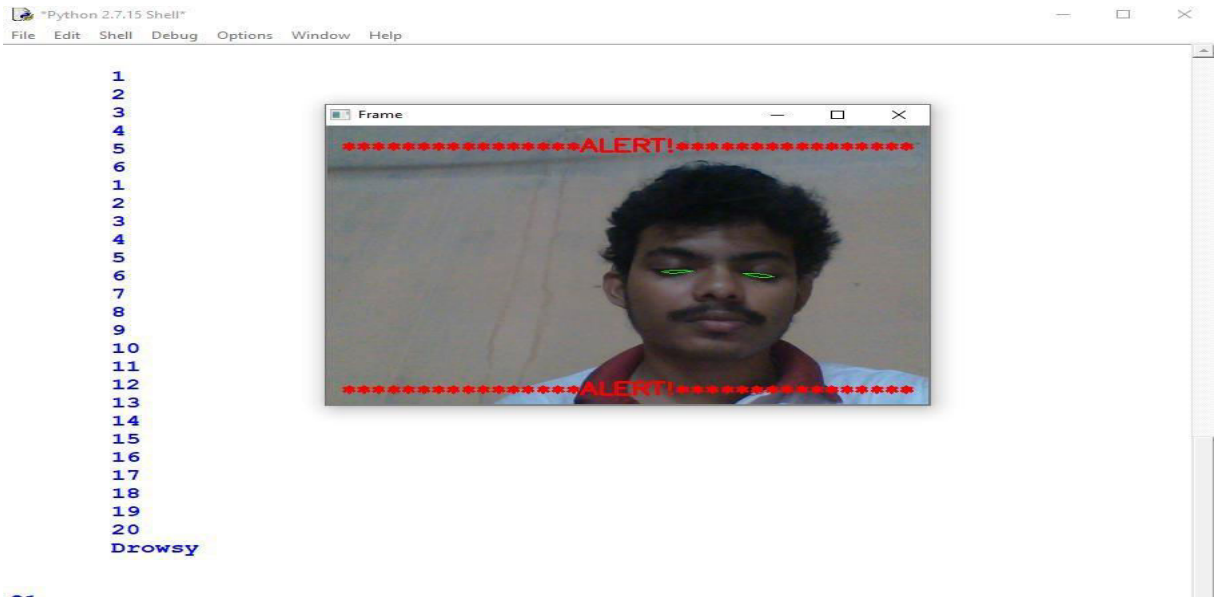

Fig 3: - after 20seconds it will give the alert

5. CONCLUSION

The driver abnormality monitoring system developed is capable of detecting drowsiness, drunken and reckless behaviours of driver in a short time. The Drowsiness Detection System developed based on eye closure of the driver can differentiate normal eye blink and drowsiness and detect the drowsiness while driving. The proposed system can prevent the accidents due to the sleepiness while driving. The system works well even in case of drivers wearing spectacles and even under low light conditions if the camera delivers better output. Information about the head and eyes position is obtained through various self-developed image processing algorithms. During the monitoring, the system is able to decide if the eyes are opened or closed. When the eyes have been closed for too long, a warning signal is issued. processing judges the driver's alertness levelon the basis of continuous eye closures.

FURTHER ENCHANCEMENT:

In this work, for both of the features sets, we used simple mean, min, max, and standard deviations for our aggregation functions. It remains future work to try other aggregate functions such as Fourier transforms and wavelets to see if they can improve classification. For the ground truth, we assumed that if the driving is done at late night, then the driver is drowsy. This is a strong assumption and may not be the case in the real world. A driver may be drowsy at parts of the run and awake on other parts of the run. Therefore, for future work, we would like to try and detect parts of the run where the driver is drowsy. This is a more challenging task and requires more complicated features.

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