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Drowsiness Detection And Warning System

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Abstract
Drowsiness or a fatigue of a driver is the major reason for road accidents. This paper represents a new way towards safety as well as security of automobiles. We are using the concept of Iris recognition system, Drowsiness detection, Distress signaling system using non intrusive machine. Nowadays driver fatigue related crashes has increased. The main aim of our project is to develop non-intrusive system which will detect the fatigue or drowsiness of driver and will issue a warning with the help of alarm. As most of the accidents are caused due to drowsiness so this project will help to decrease the crashes or accidents. In this project we will detect the eye blinking with the help of webcam. If the eyes of the person are closed for more interval of time then this will result into the warning in the form of sound.

Keywords
Drowsiness, driver fatigue, distress signaling system, driver assistance, fatigue detection.

I. Introduction

LOSS of attention in automotive drivers has been reported to be a major cause of road accidents. Hence, to prevent these accidents, onboard monitoring of the alertness level in automotive drivers is necessary. The alertness level can be assessed using different measures, such as electroencephalogram (EEG) signals, ocular features, blood samples, speech, and others. The EEG-based method has been reported to be highly authentic for estimating the state of drowsiness. However, an onboard measurement of EEG signals may cause discomfort to the driver and also cause artifacts. In, Ji reported a review of noninvasive techniques to monitor human fatigue.

The vision-based approaches, which are noncontact in nature appear to be promising for estimating the aforementioned parameters. There have been some studies, with regard to eyelid movements, such as blink frequency, average eye-closure speed (AECS), percentage of eye closure (PERCLOS), etc., as quantitative measures of the drowsiness level of an individual.

Detection of fatigue involves a observation of a face, detection of eye position and the observation of eye status. The analysis of face images is a popular research area with applications such as face recognition, virtual tools, and human identification security systems. In this the project will focus on the localization of the eyes, which involves looking at the entire image of the face, and determining the position of the eyes, by a self developed image-processing algorithm. Once the position of the eyes is located, the system is designed to determine whether the eyes are opened or closed and detect fatigue. Developed system works efficiently even in the presence of different illumination sources in the background, unlike the previous research which requires that there should be dark background behind the user.

II. Problem Definition

The main purpose of this project is to develop prototype Drowsiness System. In United states from 1989-1993 approximately 100,000 crashes were reported by police per year, all the crashes are related to drowsiness. Fatality Analysis Reporting System (FARS) reported that around 71,000 of all crashes were non-fatal injuries & 1,357 resulted in mortality. Many of the road accidents were not reported & verified by police, because the problem is very large.

Nowadays more accident occurs in trucks and cars than vehicles due to drowsiness. Nearly 97% of crashes of vehicles happen due to drowsiness of driver. It results into loss . for eg: human loss, money loss, medical loss. The accident or crashes not only affect the internal system but also to outside world. 70% injury occurs in internal system and 30% injury happen to the external system. Environmental loss is one of the disadvantage of accident. Accidents results in human as well as non human loss.

III. Existing system

Recently most of the accident occur due to drowsiness of drivers in cars and trucks. Annually 1200 deaths and 76000 injured. This approaches include analysis of police reported crash data, in-depth on-site investigations immediately following a crash of the general driving population.

Fig. 1 : Loss due to drowsiness

IV. Proposed System

The current study was designed to provide further information for traffic safety and others could use in their efforts to reduce the number of drowsy related crashes. The study had the following principles: 1- to verify message that need to be conveyed.

Why are these people in drowsy-related crashes? Is it due to long sleep or is minor sleep the bigger problem? What do person already know and practice with regard to drowsy driving?

2-to examine potential under-reporting of drowsy-related crashes. The literature suggest that drowsy-related crashes are under-reported by law enforcement officers. We wanted to examine and study the extent to which drivers statements corroborated

the police report.

V. Block Diagram

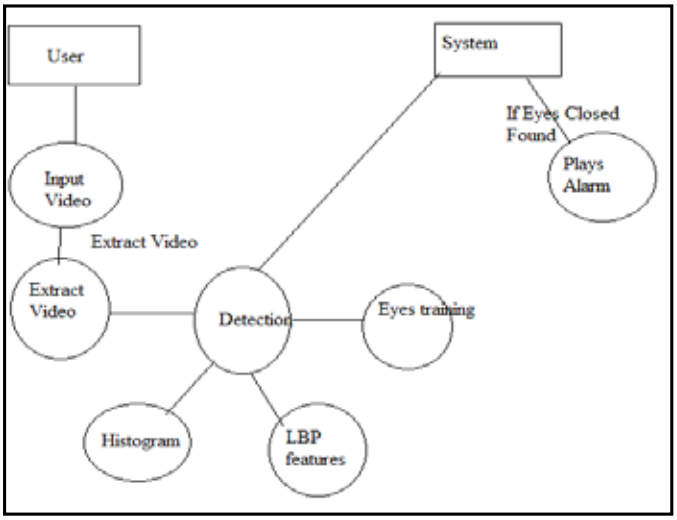

Fig. 2: Block diagram

Working steps:-3
Input video-> extract video -> frame creation ->
Recognition -> {involves
->eyelid detection
->eye training
->NIR image
->LBP features
->histogram
}
Final output

A. User

as shown in above block diagram the user will provide the input video to the system of which we want to detect drowsiness

B. Extract Video

this is next step in which the input video given by user to the system is extracted.
Extraction is the process in which frames are created from input video which are then used for eye detection(eye position and eye detection etc)

Fig. 3: Creation of frames

C. Detection

in detection process eyelid detection, eye training, NIR image, LBP features, histogram algorithms are used. By using this algorithm system can detect eyelid ,position of eye on face , its nearest image recognition, its least binary features and histogram for detecting whether eyes are open or closed.

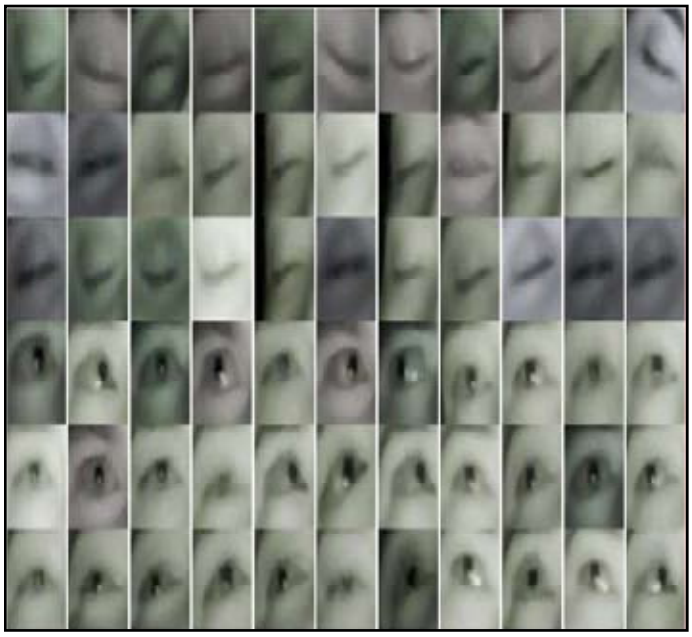

Fig. 4: Eye training detection

D. System

if the system found that numbers of frames having similar images in which the persons eyes are closed occur sequentially, then the system will play a alarm in the form of sound. The process of deactivating the alarm in manual and not automatic. The user should manually close the alarm.

E. Eye detection in NIR images

PCA based method which was used earlier for eye detection was failed as it does not support in night driving condition. So to overcome this drawback near infrared lightning is used.
For detection of eyes in NIR images block LBP histogram features are used.[2]

F. Features of LBP

In various application and eye detection technique LBP features are used. As it is simple and easy it is a popular approach. The LBP operator is a measurement for grayscale invariant texture. It is obtained from texture's general definition.

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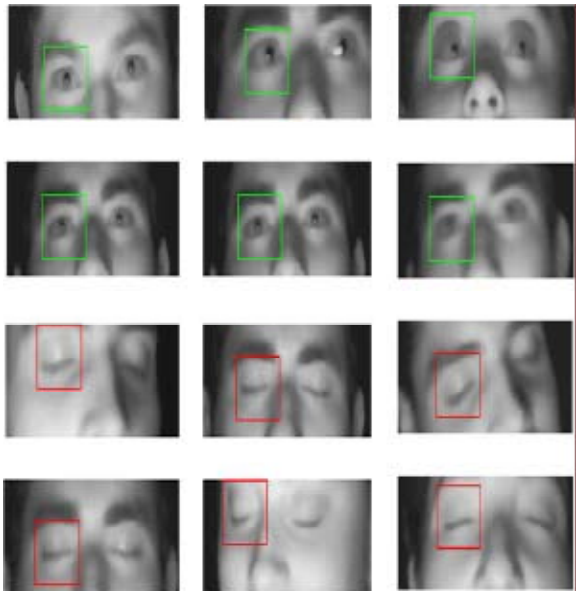
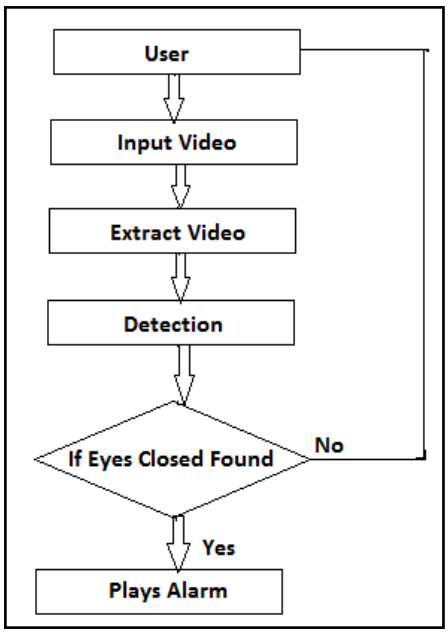


Fig. 5: Eye localization using LBP

VI. Flowchart



The algorithm we are using in this project is fast as compared to the PERCLOS which was used by others, therefore the processing time of our system is less, hence this system is fast and will issue a warning in the form of sound

VIII. Advantages

1. Detects drowsiness
2. Decreasing road accidents
3. System implemented without using database storage
4. No wires, cameras ,monitor or other devices are to be attached or aimed at the driver
5. Due to the non obstrusive nature of these methods they are more practically applicable

IX. Disadvantages

1.it will not work with people having dark skin
2.there should not be any reflective object behind the driver

X. Conclusion

In this paper , a real time system for monitoring and detecting the loss of attention in automotive drivers has been represented. In this approach the face of the driver has been detected using number of algorithm and warning is given to the driver to avoid real time crashes. A non intrusive method of drowsiness detection using steering data s possible. Methods may be applied to detection of fatigue other related driver performance.

PCA based method is used while detecting the drowsiness for daytime and LBP based method is used at night time.

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