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Real Time Driver Drowsiness Detection Systemusing Facial Features

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ABSTRACT- As per the previous year's report concerning to road crashes indicates that the principal cause of such a fatal road accidents is because of negligence behavior as well as drowsiness of driver. This problem reveals the requirement of such a system that can recognize drowsiness state of driver and givesalert signal to the driver before the occurrence of any accidents. Therefore, this proposed work has established drowsy detection as well as accident avoidance system based on the eye blink duration. Here, first the open and close state of eye are detected based on the eye aspect ratio (EAR). Further, the blink duration or count during the changes of eye state from open to close are analyzed. Then, it identifies the state of drowsiness, when blink duration becomes more than a certain limits and it produces the alarm, so the driver can wake up and get alert. Our developed system has shown the good accuracy.

I.INTRODUCTION

The word "Drowsy" looks very simple but it becomes more crucial in the condition when someone involves in performing jobs where deep concentration is an important factor like working in chemical factory or driving a heavy vehicle etc. In such scenario, once the person is deviated from his/her proper concentration, a great disaster may occur. As observed, most of the road crashes are caused due the negligence behavior driver when he/she is in state of fall asleep or in drowsy condition while driving the vehicle. According to the report 2018 based on the road accidents in India presented by Ministry of Road Transport & Highway, disclose that 4, 67,044 accidents took place in states as well as in Union Territories. Further, the analysis of this report shows that 78% road crashes out of total were caused due driver's inattention. Therefore, there is a need to develop a model that could avoid such a destructive road crashes and save the precious lives of mankind. Here, our proposed work satisfies these requirements.

The various techniques that have been employed till date in order to recognize the drowsy state of driver can be mainly categories into three classes such as physiological, behavioral and vehicle parameter based techniques. Among these technique, physiological as well as vehicle based techniques are intrusive in nature whereas behavioral based technique is non intrusive in nature. Here, the word intrusive means extra equipment thatis needed to be attached with the body of driver to fetch the data to identify the state of driver. So, we have considered the 'behavioral' based technique in our proposed work. This technique uses the visual cues for

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determining the state of drowsiness of driver. In our designed framework, detection of drowsy state of driver is primarily based on blinking characteristics of eye using eye aspect ratio parameter.

II. LITERATURE SURVEY

As the number of vehicles increases, road accidents are on the rise every day. According to the World Health Organization (WHO) survey, 1.4 million people have died, and 50 million people have been injured worldwide every year. The key cause of death is the unavailability of medical care at the accident site or the high response time in the rescue operation. A cognitive agent-based collision detection smart accident alert and rescue system will help us to minimize delays in a rescue operation that could save many lives. With the growing popularity of smart cities, intelligent transportation systems (ITS) are drawing major interest in academia and business, and are considered as a means to improve road safety in smart cities. and sends it to the cloud. In the cloud, once the accident is detected, a deep learning (DL) model is used to validate the output of the IoT module and activate the rescue module. Once the accident is detected by the DL module, all the closest emergency services such as the hospital, police station, mechanics, etc., are notified. Ensemble transfer learning with dynamic weights is used to minimize the false detection rate.

Every day, automobile injuries bring about a excessive range of deaths and injuries, with mishandling and next injuries accounting for a sizeable percentage of these. Automatic detection of automobile injuries can, to a few extent, lessen the time it takes for rescue experts and motors to reply withinside the occasion of an twist of fate, enhancing rescue performance and street safety. We recommend a way for robotically detecting car injuries primarily based totally on cooperative car infrastructure systems (CVIS) and pc imaginative and prescient on this article. To begin, clean CADCVIS imagery is being evolved that allows you to boom the accuracy of CVIS's intelligence-primarily based totally twist of fate detection street devices. CADCVIS, in particular, is made of numerous twist of fate kinds, climate conditions, and twist of fate sites, all of that may assist twist of fate detection strategies self-adapt to various visitors situations. Second, we create the YOLOCA deep neural community version for twist of fate detection, that's primarily based totally on CADCVIS and deep studying strategies.

Till date, there has been a lot of study about predicting a detecting the vehicle accident but there has not been pre intimation to the drivers about the accident. In this project, we propose to overcome the accident. The objective of this paper is to understand the various techniques that have contributed in the curb of accidents especially by preventing and detecting accidents. A study on different proposed methodologies involving various techniques for the stages involved along with their advantages and disadvantages is done which can help in the determination and appropriation of an efficient, accurate accident alert and detection system. System specifications based on thorough analysis of existing solutions and literature are proposed. Critical analysis and review of the systems that have contributed in accident alert and detection.

III. PROPOSED SYSTEM

The word intrusive means extra equipment that is needed to be attached with the body of driver to fetch the data to identify the state of driver. So, we have considered the 'behavioral' based technique in our proposed work. This technique uses the visual cues for determining the state of drowsiness of driver. In our designed framework, detection of drowsy state of driver is primarily based on blinking characteristics of eye using eye aspect ratio parameter.

The proposed work, we have adopted the Histogram equalization technique which equally distributes the intensity values throughout the frame as a pre-processing step. Thus, it diminishes the effect of uneven dispersion of light in each frame. Further, we have employed the Gamma Correction method to enhance the contrast through the nonlinear transformation among the input as well as output mapped values as a pre-processing step. eyes i.e. open or close by imposing some threshold value. Thus status of drowsiness i.e. alert or drowsy is detected through the blink duration as well as number of frames involved during the blinking.

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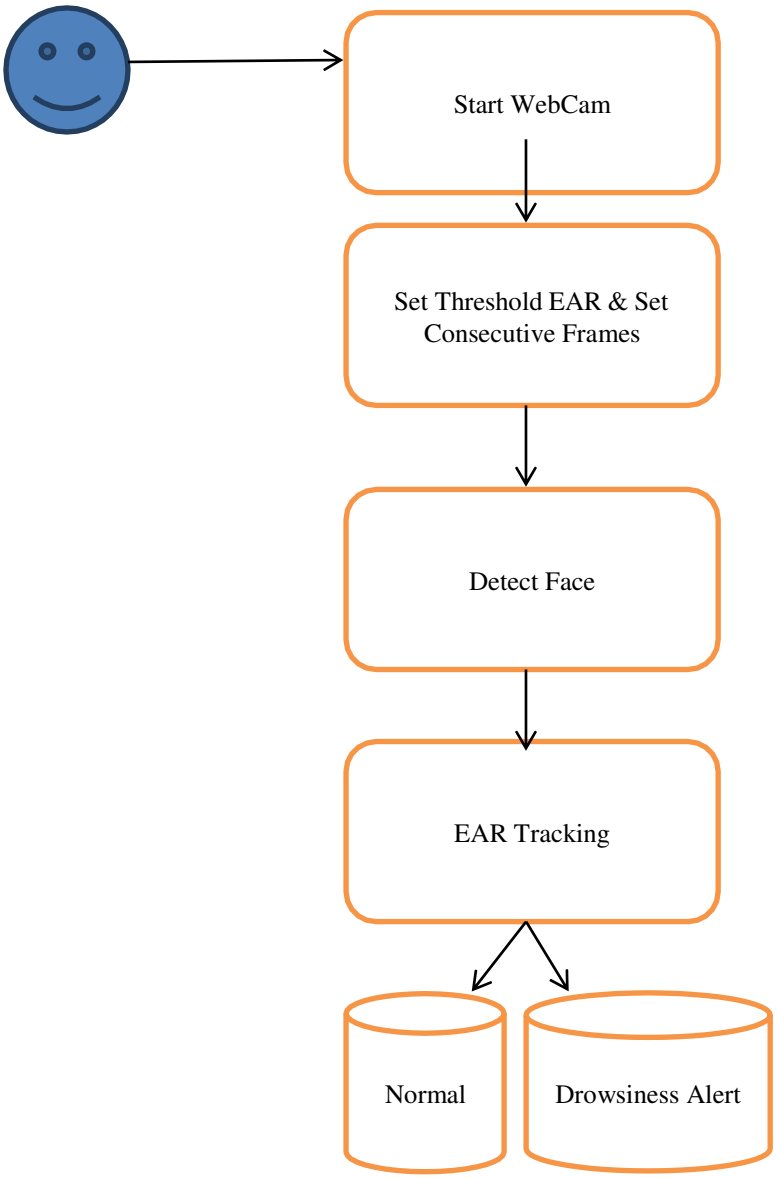
Advantage:

- In order to resolve the problem shown by physiological a well as vehicle characteristics based drowsiness iscussed in above paragraphs, the computer vision techniques came into the existence
- In present era, this technique has become more popular due to low cost of execution and easy to configure with the vehicle as well as its non-intrusive nature.
- In our proposed work we have developed such a system which can easily be deployable on a machine, robust and reliable to use.
- This developed method is highly suitable in comparison of physiological method based system such as EEG, EOG etc. because it is intrusive means there is no need to attach any extra equipment with the body of driver to detect the state of drowsiness. Here, mainly two parameter i.e. EAR, time duration
(T) is used to make the decision of drowsy state of driver..



Flow diagram of driver drowsiness detection

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IV. MODULES

Input Acquisition:
The input video is taken as a live video from the webcam, which are having the properties that are in the RGB. It is having both in the lightning and diminish format. The person who wanted to drive is placing their eye on the web camera, which are been used to detect the better resolution. The retina will be detected in such a way that are used to validate the person mind though through the detection.

Preprocessing:
The preprocessing is common step that are been used to extract the accurate video from the noisy format. Thus in our case the preprocessing is done on the RGB image, that are having the 255 range of pixels. There are having some of the minor difference in the human left and right eye. In the preprocessing module, our work there are detecting the open eye iris and circle the retina part of the eye for the further processing. There are highlighting some features, which are used to enhance the image for the preprocessing step. The captured video are having the non uniform form of the retina image that is illuminating to correct the unwanted noise in the image which is caused by the in-accurate fixing of the of the eye in the acceptable location.

Face Detection:
In our designed framework, we have considered the facial feature tracker library to detect the face from image of driver. Since libraries based on Histogram of Oriented Gradient (HOG) feature descriptor for face detection. Here, in a simple word, gradient is a sudden change in pixel value when we step from left to right or top to bottom i. e. from black to white or vice-versa. Moving from left to right give the horizontal gradient as well as movement from top to bottom gives the vertical gradient.

Eye Detection:
The different feature related to face gives the obvious sign of drowsy state. The eyes give the symptoms of slow as well as fast blinking whereas mouth indicates the drowsiness condition through the yawning. Along with these features, head movement also notice the state of drowsiness once it incline downward or nodding continually. Among these features, blinking of eyes is the prominent one to decide the state of drowsiness as per the various studies discussed above. Since, in our designed framework, we have imported the facial shape predictor packages to eliminate the inbuilt landmarks for the both the eyes from the available landmarks.

Eye Aspect Ratio (EAR)
Eye aspect ratio (EAR) was estimated from the spot of the selected landmarks coordinate. The EAR shrinks speedily towards the zero during the state of drowsiness. EAR is the ratio of vertical to the horizontal length of eye. Contiguous landmarks of package are necessary to localize the each eye i.e. either left or right eye. These landmarks play a key role in the computation of eye aspect ratio.

Blink Detection
The value of EAR varies as per the different state i.e. open or closed. From the experiment, we have considered a threshold for EAR in order to establish the distinction among the open as well as close state of eye. Here, time elapsed during closing state of eye is assumed as T. The different state of driver on the basis of EAR value and elapsed. Since, it is assumed that time elapsed between two consecutive frame is 100ms. Therefore, time elapsed during eye closing can also be consider in terms of number of frames. User can make these in the settings part.

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Alert:

In the final module, we develop the Drowsiness alert according to the Eye Analysis Ration (EAR), so the driver gets the Alert sound and so the driver can know that he/she is in sleepy stage and take necessary actionaccordingly, which prevents the accident.

V. EXPERIMENT AND RESULT

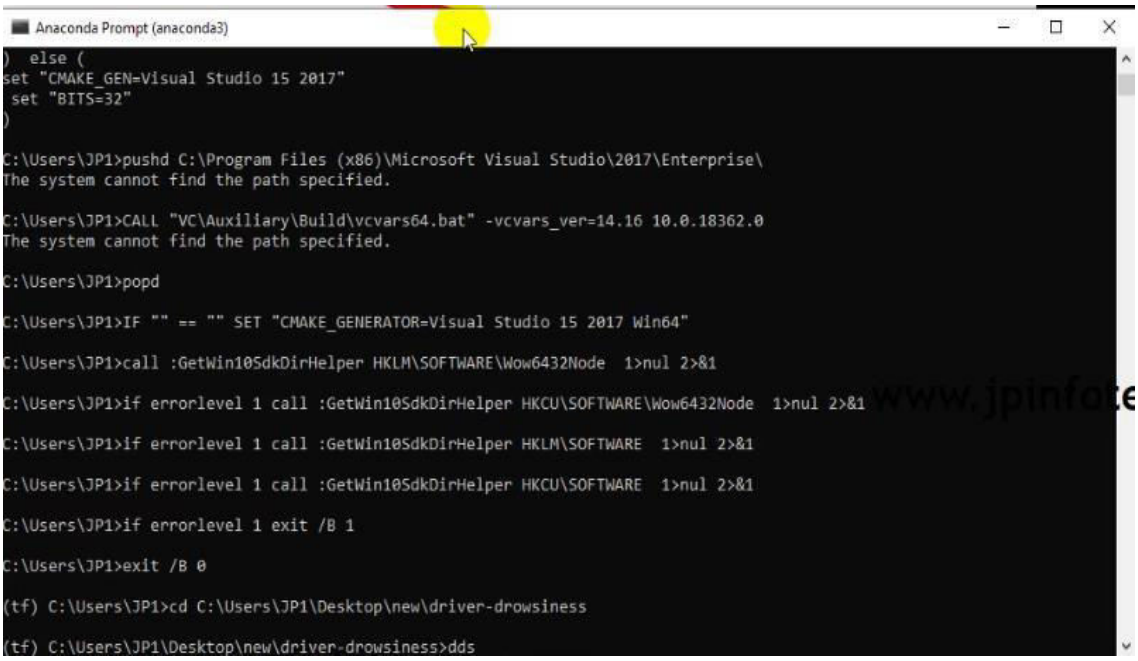

FIGURE 1 : ANACONDA LOGIN COMMAND

FIGURE 2: SETTINGS

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FIGURE 3: DROWSINESS LOGIN PAGE

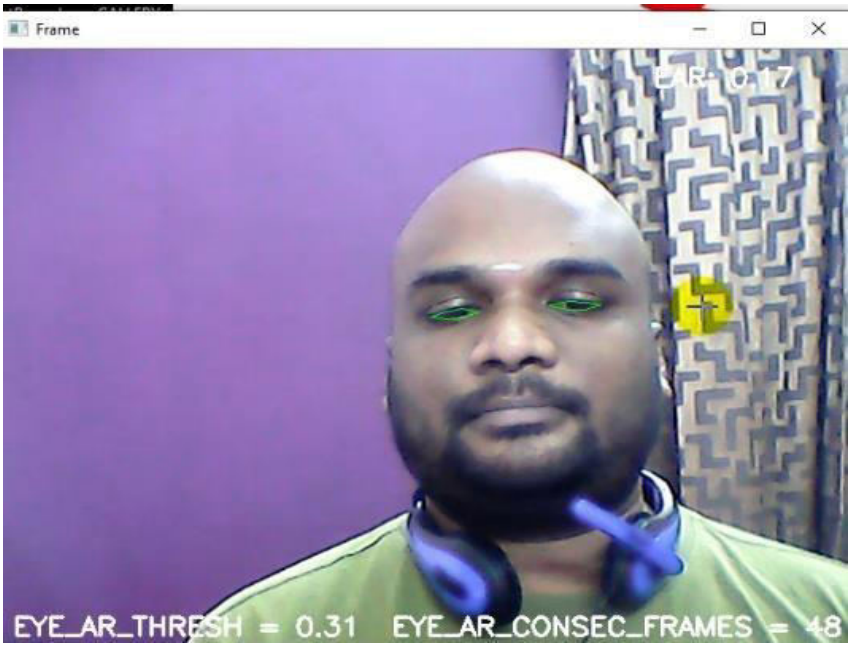

FIGURE 4 : DETECTING EYE SENSOR

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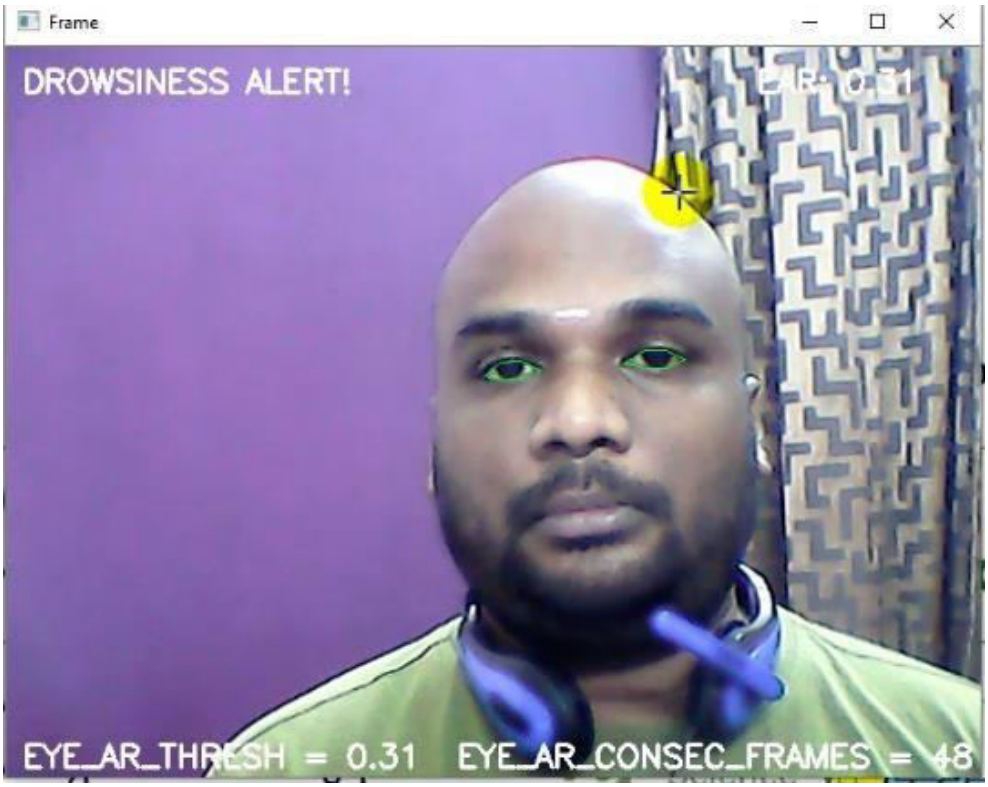

FIGURE 5: EYE DROWSINESS ALERT

VI.CONCLUSION

This project proposes a drowsiness detection system based on driver behavior. The role of the system is to detect facial landmark from the live webcam that are collected while the person is driving the vehicle by a camera module attached to the vehicle and deliver the obtained data to the trained model to identify the driver's state and provide an alert if the driver feels drowsy.

In our proposed work we have developed such a system which can easily be deployable on a machine, robust and reliable to use. This developed method is highly suitable in comparison of physiological method based system such as EEG, EOG etc. because it is intrusive means there is no need to attach any extra equipment with the body of driver to detect the state of drowsiness. Here, mainly two parameter i.e. EAR, time duration (T) is used to make the decision of drowsy state of driver. First, we compare the EAR value with pre initialized threshold value. For a moment when value of EAR is less than the threshold then state of eye changes from open to close. Here, a blink counter is used whose value is increased in this scenario. Actually, this counter keeps the track of time elapsed in the drowsy state. If the value of this counter is rise above the certain limits then an alert message will be generated for the driver to make him to be alert.

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REFERENCES

[1] "Road Accidents in India 2018". Available: https://morth.nic.in/sites/default/files/Road_Accidednt.pdf, pp. 1-125

[2] Forsman, Pia M., et al. "Efficient driver drowsiness detection at moderate levels of drowsiness." Accident Analysis & Prevent ion 50 (2013): 341-350.

[3] Simon, Michael, et al. "EEG alpha spindle measures as indicators of driver fat igue under real traffic condit ions." Clinical Neurophysiology 122.6 (2011): 1168-1178.

[4] Massoz, Quent in, et al. "The ULg multimodality drowsiness database (called DROZY) and examples of use." 2016 IEEE Winter Conference on Applications of Computer Vision (WACV). IEEE, 2016.

[5] Svensson, U. Blink behavior based drowsiness detection. No. LiUIMT- EX-04/369,. 2004.

[6] Bergasa, Luis Miguel, et al. "Real-time system for monitoring driver vigilance." IEEE Transact ions on Intelligent Transportation Systems 7.1 (2006): 63-77.

[7] Zhihong, Wu, and Xiao Xiaohong. "Study on histogram equalization." Intelligence Information Processing and Trusted Comput ing, International Symposium on. IEEE Computer Society, 2011.

[8] Kubinger, Wilfried, Markus Vincze, and Minu Ayromlou. "The role of gamma correction in colour image processing." 9th European Signal Processing Conference (EUSIPCO 1998). IEEE, 1998.

[9] Kazemi, Vahid, and Josephine Sullivan. "One millisecond face alignment with an ensemble of regression trees." Proceedings of the IEEE conference on computer vision and pat tern recognition. 2014.

[10] Dalal, Navneet, and Bill Triggs. "Histograms of oriented gradients for human detect ion." 2005 IEEE computer society conference on computer vision and pat tern recognit ion (CVPR'05). Vol. 1. IEEE, 2005.

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