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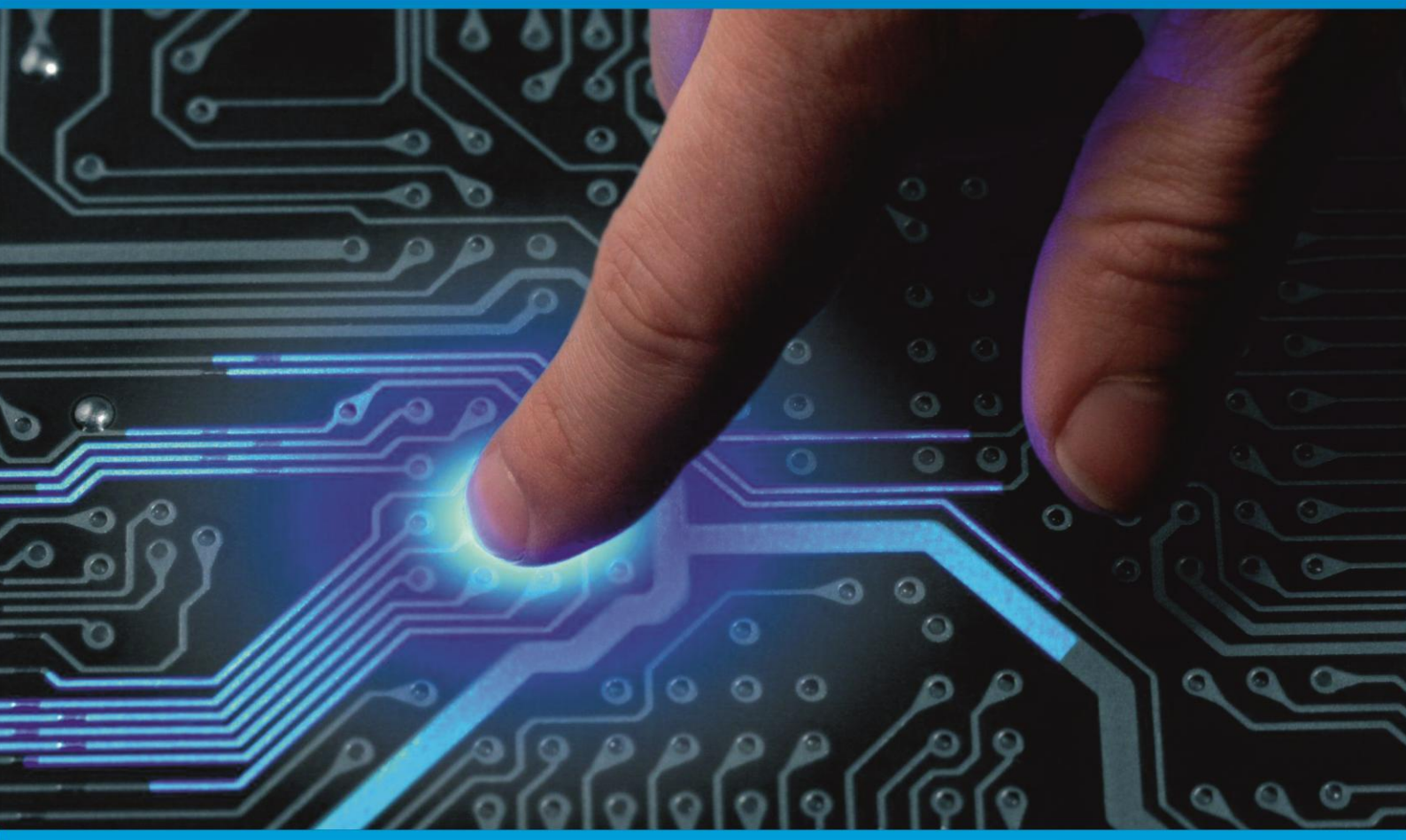

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Image processing Based Driver Sleepiness Detection System

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ABSTRACT: With the predictions of World Health Organization (WHO) that number of deaths due to traffic accidents will be around 2 million with less than 15 years, researchers nowadays are paying more attention in how to help in preventing traffic accidents and lower the number of occurred fatalities. The purpose of this study is an attempt to prevent traffic accidents due to fatigue or sleepiness. Developed system uses a camera and image processing techniques embedded in a CNN classifier module to detect driver's eyes and decide whether the driver is sleepy or not. Based on this decision an alarm system will be activated.

KEYWORDS: "Fatigue", "Drowsy", "Face Detection", "Region of Interest", "CNN classifier", "alert".

I. INTRODUCTION

Road traffic injuries and deaths have a terrible impact on individuals, communities and countries. They involve massive costs to often overburdened health care systems occupy scarce hospital beds consume resources and result in significant losses of productivity and prosperity, with deep social and economic repercussions [1]. According to the 2016 report of WHO, 1.24 million road traffic deaths occur every year. This makes it the number one cause of death among those aged 15-29 years. This number is predicted to increase to around 1.9 million by 2030 and to become the seventh leading cause of death if no action is to be taken [1]. According to the monthly report of traffic accidents in Turkey, 16.785 out of the 18.965 accidents occurred in April 2018 because of the diver faults while the rest of these accidents reasons were divided between passengers, pedestrian, car itself and road [2]. Image processing has been used for many decades for processing videos and images for different real-time applications. with the invention of new processors of high processing capabilities and high definitions cameras, it became much easier to develop real-time application that can perform similar than humans with much better accuracy and less expenses. To do so, many software and libraries has been introduced to help researches and developer in building their systems in a faster and easier way. OpenCV (Open Source Computer Vision) is a library of programming functionsmainly aimed at real-time computer vision, developed by Intel Russia research centre in Nizhny Novgorod. It is a free crossplatform library. It focuses mainly on real-time image processing. Library contains a wide range of machine learning algorithms. All designed to be highly modular, quick to execute, and simple to use via a clean and modern. It is used in a wide range of applications including robotics, embedded devices, mobile phones, and large highperformance computing environments [3]. The Haar Cascade classifier was proposed in 2001 by Paul Viola and Michael Jones to find objects in videos or pictures. They used a boosted cascade of simple features to rapidly detected objects. Haar Cascade is also known as Viola-Jones detector [4].In this study, an image processing approach was followed. CNN classifier was utilized with codes written in python language with OpenCV and libraries. A Haar Cascade classifier was used to detect faces in the video sequences acquired from the camera in a real-time mode. The system is very useful, fast and advantageous, and it worked smoothly in during our field tests.

II. LITERATURE SURVEY

Driver Drowsiness Detection System and Techniques: According to the studies, it has been observed that when the drivers continuously drive without taking a break, they run a high risk of becoming drowsy. The study shows that accidents occur due to sleepy drivers in need of a rest, which means that road accidents occur more due to drowsiness rather than drink-driving. Attention assist can warn of inattentiveness and drowsiness in an extended speed range and notify drivers of their current state of fatigue and the driving time since the last break, offers adjustable sensitivity and, if a warning is emitted, indicates nearby service areas in the COMAND navigation system. Implementation of the

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Driver Drowsiness Detection System: This paper is about making cars more intelligent and interactive, which may notify or resist a user under unacceptable conditions, they may provide critical information of real-time situations to rescue or police or the owner himself. Driver fatigue resulting from sleep disorders is an important factor in the increasing number of accidents on today's roads. In this paper, we describe a real-time safety prototype that controls the vehicle speed under driver fatigue. To advance a system to detect fatigue symptoms in drivers and control the speed of the vehicle to avoid accidents is the purpose of such a mode. In this paper, we propose a driver drowsiness detection system in which a sensor like the eye blink sensor is used for detecting drowsiness of the driver. If the driver is found, sleeping, the buzzer will start buzzing and then turn the vehicle ignition off. Driver Drowsiness Detection System: One of the major causes of traffic accidents is the driver‘s drowsiness. It is a serious highway safety problem. If drivers could be warned before they became too drowsy to drive safely, some of these crashes could be prevented. In order to reliably detect the drowsiness, it depends on the presentation of timely warnings of drowsiness. To date, the effectiveness of drowsiness detection methods has been limited by their failure to consider individual differences. Based on the type of data used, drowsiness detection can be conveniently separated into the two categories of intrusive and non-intrusive methods. During the survey, non-intrusive methods detect drowsiness by measuring driving behaviour and sometimes eye features, through which a camera-based detection system is the best method and so is useful for real-world driving situations. This paper presents the review of existing drowsiness detection techniques that will be used in this system like Circular Hough Transform, FCM, and Lab Colour Space etc. Drowsiness Detection System Using MATLAB: As the survey done, driver fatigue is the major reason why half (50 %) of road accidents take place. It is a great challenge in today’s day to detect drowsiness in order to prevent accidents. Various experiments have been done earlier with regard to the drowsiness detection of the driver. In the past few years, many countries became curious to pay high attention to driver’s safety problems. Researchers have been making various efforts to invent techniques for the detection of drowsy drivers such as monitoring of the road and physiological techniques which require the contact of an electrode with our body such as the chest, face, making it and implantable methods. Detecting Driver Drowsiness Based on Sensors: Researchers have attempted to determine driver drowsiness using the following measures: (1) vehicle-based measures; (2) behavioural measures and (3) physiological measures. A detailed review on these measures will provide insight on the present systems, issues associated with them and the enhancements that need to be done to make a robust system. This paper reviews the three measures as to the sensors used and discusses the advantages and limitations of each. The various ways through which drowsiness has been experimentally manipulated is also discussed. It is concluded that by designing a hybrid drowsiness detection system that combines non-intrusive physiological measures with other measures, one would accurately determine the drowsiness level of a driver. A number of road accidents might then be avoided if an alert is sent to a driver that is deemed drowsy.

III. DISCUSSION

The amount of data produced was large however the research was limited by a relatively small sample size. It is important to capture a wide range of differences in behaviors and that would be useful. ORD is a subjective measure of drowsiness that would state opinion about observable fact or event. There was a limited rating of ORD with use of single organism however going further improvements in drowsiness detection systems may be expected due to several factors, including improved applications, the addition of unnoticed features from heart beats and devices used for tracking the information, and the environmental conditions such as day and circumstances. A certain crowd drove at the same time wherein the time utilized for rest / sleep was same, removing time of as useful variable for training. The low sampling rate of device could not provide the accuracy of some dependent measures.

IV. PROPOSED ALGORITHM

Step 1:–
Images are given as the input to the system through the webcam. As Images are to be captured continuously we have made an infinite loop that will capture each frame. To access the camera we use cv2.VideoCapture(0) method provided by the OpenCV and then set the Capture object as(cap). To read each frame and store the image in frame variable we use cap.read() method.

Step 2:–
As The OpenCV algorithm takes only gray images as the input for object detection, hence for face detection we need to convert image first into grayscale. In OpenCV there no require of color information to detect the objects. In this project we will be using the haar cascade file for the purpose of face detection. classifier face =cv2.CascadeClassifier is used to set a path to our haar cascade xml file. Then by using

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faces=face.detectMutiScale(gray) method face is been performed. The face detection is done on the basis of x, y coordinates, the height and the width of the boundary box of the image that is provided as the input.

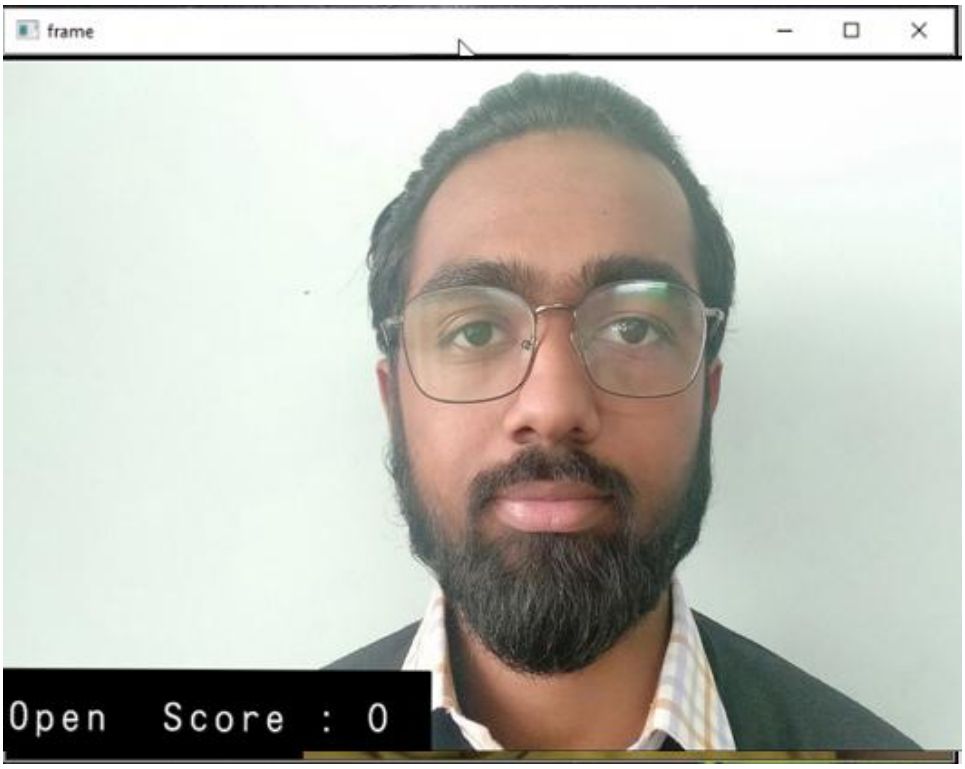
Step 3:–

The procedure to detect the eyes is similar to the procedure that is used to detect the faces. Then the leye (left eye) and reye(right eye) are categorized and then put into the cascade classifier. Then by using the left_eye-leye.detectMultiScale(gray) we detect the eyes. As we are consult to monitor the eyes of the driver we need to extract the information only of the eyes. This is done by extracting the boundary box of the eye.
After image is been extracted it is submitted to CNN classifier. This CNN classifier will decide whether eyes are closed or whether they are open.
In the similar way the information of the reye (right eye) is also obtained.

Step 4:–
Here we are using The CNN classifier to state whether eyes are open or closed. We need to first perform the necessary operations before we feed it to the model because the to start with the execution the model requires the exact measurements. By using the r_eye=cv2.cvtColor(r_eye, cv2.COLOR_BGR2GRAY) method we first convert the image into grayscale. As our model was trained on 24*24 pixel images cv2.resize(r_eye, (24, 24)), therefore we need to resize the image to 24*24 pixels. Before putting the image into the classifier we need to resize the image. We used the model= load_model(`modes/cnnCat.h5`) method to load to load our model. The model predicts that eye is open when the value of lpred[0] = 1, and predicts the eyes are closed when the value is lpred[0]=0.

Step 5:–
The score is basically a value we will use to determine how long the person has closed his eyes. The score keeps on increasing if the eyes are open and score starts falling to 0 as soon as we open are eyes. Using the cv2.putText() function we will be showing the result on the screen and will also shoe time period of eyes closed or eyes open.

V. RESULT



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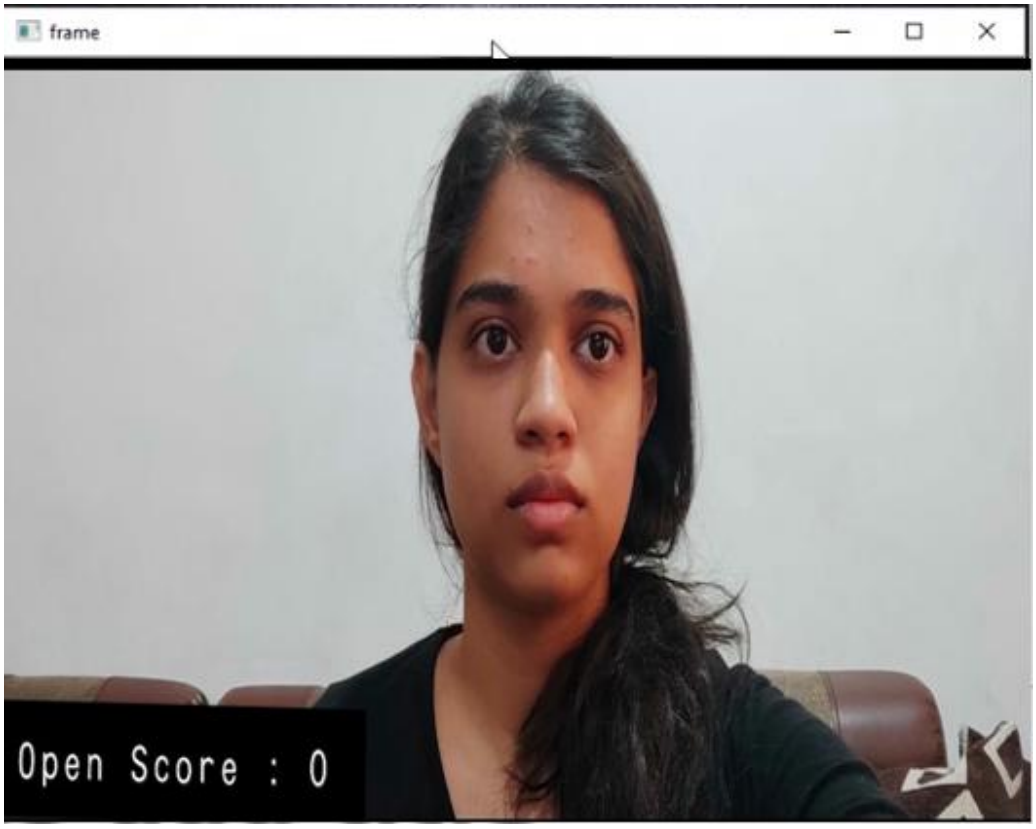

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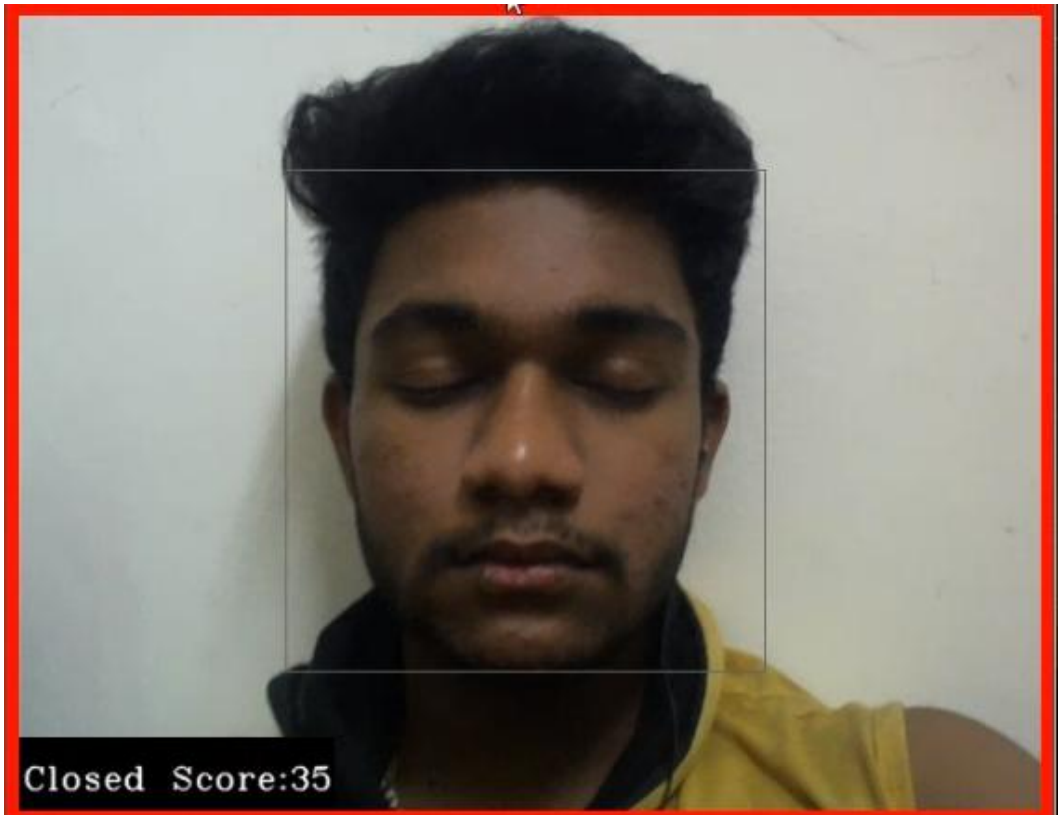

VI. CONCLUSION

In our project, we had implemented something that will help to save one's life that is Drowsiness detection and warning system using Python. Sometimes the driver may feel sleepy but if he/she still continues to drive then there is a high risk of accidents. So this can be prevented at very chip cost by using Driver Sleepiness Detection System. Here, In it will detect drowsiness by observing the eye blinking pattern means whenever the driver feels drowsiness the eyes start blinking slowly and are about to close when this action happens the interval alarm will be played so that driver immediately wake up. This project will help to prevent crashes/accidents caused due to drowsiness. We have implemented it with the help of Euclidean distance ratio i.e. eye blinking ratio it is easier to analyse the blinking ratio.

REFERENCES

1. Diddi, V.K., Jamge, S.: Head pose and eye state monitoring (HEM) for driver drowsiness detection: overview. IJISET-Int. J. Innov. Sci. Eng. Technol. 1, 504–508 (2014)Google Scholar.
2. Choi, I.H., Jeong, C.H., Kim, Y.G.: Tracking a drivers face against extreme head poses and inference of drowsiness using a hidden Markov model. Appl. Sci. 6, 137 (2016)CrossRefGoogle Scholar
3. Choi, I.H., Hong, S.K., Kim, Y.G.: Real-time categorization of driver's gaze zone using the deep learning techniques. In: 2016 International Conference on Big Data and Smart Computing (BigComp), pp. 143–148. IEEE (2016)Google Scholar
4. Friedman, J.H.: Greedy function approximation: a gradient boosting machine. Ann. Stat. 21, 1189–1232 (2001)MathSciNetCrossRefzbMATHGoogle Scholar
5. Freund, Y., Schapire, R.E.: A desicion-theoretic generalization of on-line learning and an application to boosting. In: Vitányi, P. (ed.) EuroCOLT 1995. LNCS, vol. 904, pp. 23–37. Springer, Heidelberg (1995). doi: 10.1007/3-540-59119-2_166CrossRefGoogle Scholar
6. Chen, T., Guestrin, C.: Xgboost: a scalable tree boosting system. arXiv preprint arXiv:1603.02754 (2016)

7. https://ieeexplore.ieee.org/abstract/document/8701935
8. https://www.youtube.com/watch?v=xn0E0rm3VBk
9. https://acadpubl.eu/jsi/2017-114-7-ICPCIT-2017/articles/7/16.pdf

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10. https://www.researchgate.net/publication/324044277_Android_based_real_time_advance_security_for_parking_system_in_IOT
11. https://www.researchgate.net/publication/279280033_Android_based_Smart_Parking_System

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