e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:05/May-2021 Impact Factor- 5.354 www.irjmets.com

DROWSINESS AND DISTRACTION DETECTION SYSTEM USING PYTHON

Asst. Prof. Tabassum H. Khan*[1], Ms. Shivani B. Badure*[2], Ms. Pallavi I. Dhongade*[3], Ms. Kavita D. Bharre*[4], Ms. Pranoti J. Khandagale*[5]

*[1]Professor, Department Of CSE, GHRIETN, Nagpur, Maharashtra, India.

*[2,3,4,5]Student, Department Of CSE, GHRIETN, Nagpur, Maharashtra, India.

ABSTRACT

Drowsiness of the drivers is the primary reason of accidents within the global. Because of lack of sleep and tiredness, drowsiness can occur while using. The nice manner to keep away from injuries caused by drivers' drowsiness is to locate drowsiness of the motive force and warn them earlier than falling asleep. To come across drowsiness many techniques like eye retina detection, facial characteristic popularity and yawning detection were used. Right here in this project, we propose a method of detecting driving force drowsiness the usage of eye retina detection and face distraction detection and yawning detection of the driver. As soon as the motive force is discovered drowsy an alert can be generated and a message might be printed on the display screen with the alarm for you to alert the driver quick.

Keywords: Numpy, Open-CV, Distraction Detection, Drowsiness, Yawning, Alert, Dlib, Driver Distraction.

I. INTRODUCTION

Drowsiness is surely described as “a country of near sleep due to fatigue”. It’s far technically distinct from fatigue, which has been defined as a “disinclination to keep appearing the assignment at hand”. The outcomes of sleepiness and fatigue are very much the identical. Fatigue affects mental alertness, decreasing an individual’s capability to function a car effectively and increasing the danger of human errors that would result in fatalities and accidents. Sleepiness slows reaction time, decreases consciousness, and impairs judgment. Fatigue and sleep deprivation impact all transportation operators. In each situations, driver can’t attention on number one mission of riding which may additionally beautify the likelihood of crash occurrence. Interplay among driver and vehicle such as monitoring and assisting each other is one of the vital answers for maintaining ourselves safe in the cars. Although energetic safety structures in motors have contributed to the lower within the variety of deaths happening in visitor’s injuries, the quantity of visitor’s injuries continues to be growing. Consistent with to be had statistical information, over 1.3 million humans die each year on the road and 20 to 50 million human beings suffer non-deadly injuries because of road injuries. Exhausted drivers who fall asleep on the wheel are accountable for approximately 40% of road accidents, says a take a look at through the crucial road studies Institute (CRRI) at the three hundred-km Agra-Lucknow limited-access highway. The point of this venture is to accumulate a prototype drowsiness detection machine. The spotlight could be placed on making plans a framework so that it will exactly display the open or shut condition of the driving force's eyes continuously. By tracking the eyes, its miles believed that the signs and symptoms of motive force fatigue may be detected early enough to avoid a car twist of fate. Detection of fatigue entails the remark of eye actions and blink patterns in a sequence of pictures of a face.

[1] García et. al. described ‘driver monitoring based totally on Low-cost three-D Sensors’. They proposed an answer for motive force monitoring and event detection based on three-D facts from a variety digital camera is presented. The system combines 2-D and three-D strategies to provide head pose estimation and areas-of-hobby identification. Based totally at the captured cloud of three-D points from the sensor and analyzing the two-D projection, the points similar to the top are determined and extracted for in addition analysis. MRI and a CT scan images are used in this to obtain segmentations of tumor using astronomical

[2] Bin Yang et. al. described ‘Camera based Drowsiness Reference for driving force state class below actual riding situations’. They proposed that measures of the motive force’s eyes are capable to discover drowsiness below simulator or test situations. The overall performance of the latest eye monitoring based totally in-car fatigue prediction measures are evaluated. These measures are assessed statistically and through a category technique based on a huge dataset of ninety hours of actual road drives.

[3] In 2013, G. Kong et. al. defined ‘visual evaluation of Eye state and Head Pose for motive force Alertness monitoring’. They offered visual evaluation of eye nation and head pose (HP) for continuous monitoring of

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:05/May-2021 Impact Factor- 5.354 www.irjmets.com

alertness of an automobile driver. Most existing procedures to visual detection of non-alert driving styles rely both on eye closure or head nodding angles to determine the driving force drowsiness or distraction degree. The proposed scheme makes use of visual functions consisting of eye index (EI), student interest (PA), and HP to extract critical information on non-alertness of a vehicle driver.

[4] In June, 2012, A. Cheng et. al. [5] described 'driver Drowsiness recognition based totally on computer vision technology'. They presented a nonintrusive drowsiness recognition approach the use of eye-monitoring and photo processing. A robust eye detection algorithm is introduced to address the problems as a result of adjustments in illumination and motive force posture. Six measures are calculated with percentage of eyelid closure, maximum closure period, and blink frequency, common starting degree of the eyes, opening speed of the eyes, and final speed of the eyes.

II. METHODOLOGY

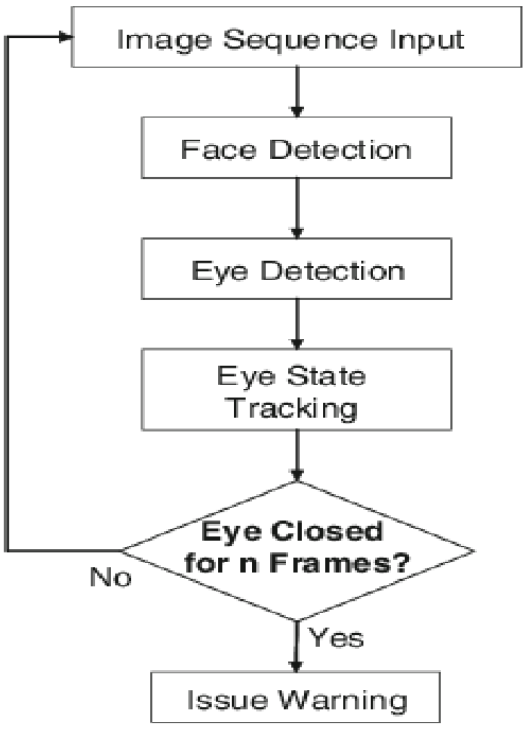

Fig.1 Flowchart of proposed system

The flowchart of the proposed machine has been proven inside the above discern. The digital camera captures the picture and sends to the processor of the pc which consists of 32 bit memory card installed with Open CV which facilitates in image processing. If the signal crosses threshold of a set of continuous frames with EAR much less than threshold fee , it will automatically makes the alarm beep and the velocity of the automobile receives reduced. In any other case that signal is rejected and subsequent signal is processed. Drivers face is monitored at some stage in using a video or net digital camera. With a view to discover the drowsiness the first step is to stumble on the face the usage of the set of frames taken via the camera. Then the vicinity of the eyes is detected and retina of the attention is continuously monitored. The captured image is sent to the processor for photo processing. It converts the acquired image to virtual sign the usage of Open CV. The virtual signal is transmitted from transmitter to the receiver. Both the transmitter and the receiver are paired up. The sign is then exceeded to the LPC2148, the microcontroller. If the signal crosses the brink fee of EAR for a given quantity of frames, then the alarm beeps and the velocity of the vehicle is automatically decreased.

III. MODELING AND ANALYSIS

1. IMAGE SEQUENCE INPUT AND FACE DETECTION:

OpenCV changed into developed retaining image processing in thoughts. Each feature and data struct of OpenCV worries itself with an image processing library. Comparatively, Matlab is highly of commonplace use & gradual. Any usefulness can be achieved through strategies for tool kits in OpenCV, it is probably cash

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:05/May-2021 Impact Factor- 5.354 www.irjmets.com

associated device compartments or explicit DNA device stash. Additionally the dlib library comes with an oriented gradients primarily based face detector histogram a facial landmark predictor comes bundled inside the library. Facial landmarks generated by way of dlib is an indexable list as defined in underneath image.

The dlib library serves us with a facial landmark detector as well as facial landmark predictor. Beneath is the facial landmarks which can be produced by using the library. Now from these landmarks, it just churn out the attention areas efficiently.

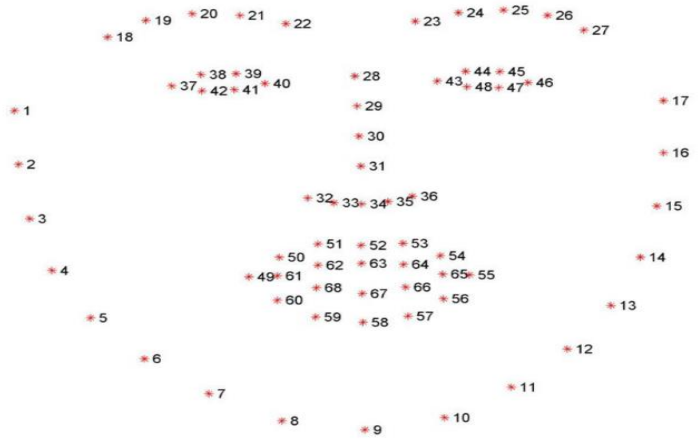

Fig 2. Facial landmarks set by dlib

2. EYE DETECTION:

$$EAR = \frac{\|p_2 - p_6\| + \|p_3 - p_5\|}{2\|p_1 - p_4\|}$$

Fig 3. Eye aspect ratio equation

This equation reflects this relation referred to as eye component ratio (EAR). Where p1,.., p6 are 2d facial landmark region. The numerator of this equation computes the space among the vertical eye landmarks which the denominator computes the space among horizontal eye landmarks, weighting the denominator appropriately due to the fact there's handiest one set of horizontal points but two sets of vertical points. Now for calculating the eye-element ratio we need to compute the Euclidean distance among the facial landmarks factors which in turn wishes SciPy bundle in python. (It not a strict requirement however SciPy is needed if paintings associated with laptop imaginative and prescient or photo processing is intended). Also the package named imutils is wanted for photo processing and laptop vision capabilities to assist the operating with OpenCv.

IV. RESULTS AND DISCUSSION

Following is the table representing four test instances which are too encountered even as doing this venture that issues with the drowsiness of the driver.

Test cases	Eyes Detected	Eye closure	Result
Case1	NO	NO	No result
Case2	NO	NO	No result
Case3	YES	NO	No alarm
Case4	YES	YES	Alarm beeps

Fig 4. Test Instances

On the factor while the eyes are close for greater than positive degree of edges then we find that the driver is feeling tired. Henceforth these instances are prominent is and a caution sounded. To get the final results a large no of images were taken and their accuracy in deciding eye glints and drowsiness was tried. For this assignment we utilized a five megapixel webcam associated with the pc. The webcam had built in white LEDs connected to it to reveal it is running. In real time scenario, infrared LEDs should be utilized rather than white LEDs with the intention that the framework is non-meddling. Inbuilt speaker is applied to supply sound output so as to awaken the driving force while drowsiness is detected.

Accuracy:

For accuracy detection of Eye Detection and Drowsiness Detection is as follows:

Formula for Eye Detection Accuracy:

Eye Detection Accuracy = total quantity of instances eyes detected / (general no. of eyes detected+ overall no of times eyes no longer detected)

Formula for Drowsiness Detection Accuracy:

Drowsiness Detection Accuracy = total no. of times alarm sounds / (general no. of instances alarm sounds + overall no of times alarm didn't sound)

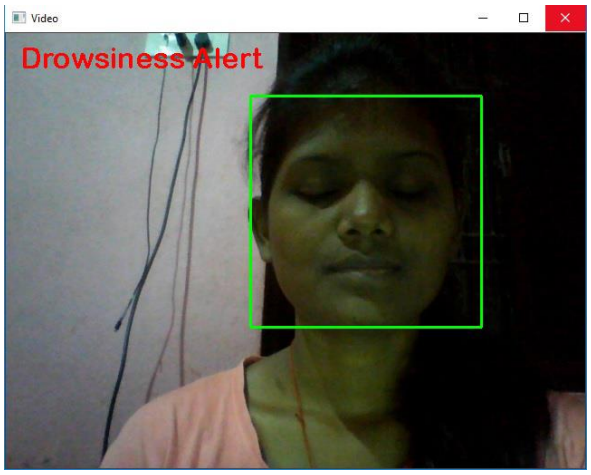

Fig. 5 Drowsiness Detection Output

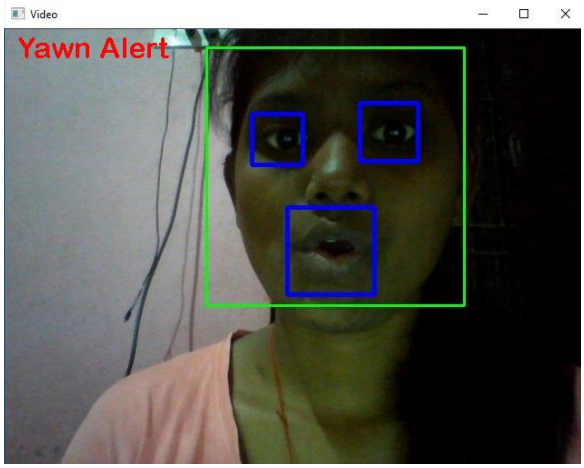

Fig. 6 Yawn Detection Output

V. CONCLUSION

The proposed system is designed keeping in mind that accidents taking place due to drowsiness and distraction of the drivers can be reduced using the technology python and its various amazing libraries which we have used for different purposes. We conclude this project as a great step toward saving driver's as well as other's life by implementing this project, we reviewed many research papers and surfed internet there are many other technologies and hardware sensors who have worked on it but we have implemented all the modules like

detection of drowsiness, distraction of the driver, yawn detection using mouth open close timing, and voice alert using playsound library. This system will help everyone to stay alert while driving and hence save the life of all.

VI. REFERENCES

[1] Gustavo A. Peláez C., Fernando García, Arturo de la Escalera, and José María Armingol," Driver Monitoring Based on Low-Cost 3-D Sensors." IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 15, NO. 4, Page(s): 1855 - 1860 AUGUST 2014.

[2] Fabian Friedrichs and Bin Yang, "Camera-based Drowsiness Reference for Driver State Classification under Real Driving Conditions" 2010 IEEE Intelligent Vehicles Symposium University of California, San Diego, CA, USA June 21-24, 2010.

[3] Ralph Oyini Mbouna, Seong G. Kong, Senior Member, IEEE, and Myung-Geun Chun," Visual Analysis of Eye State and Head Pose for Driver Alertness Monitoring." IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 14, NO. 3, SEPTEMBER 2013.

[4] Zhang, Wei; Cheng, Bo; Lin, Yingzi," Driver drowsiness recognition based on computer vision technology." Published in: Tsinghua Science and Technology (Volume: 17, Issue: 3) Page(s):354 - 362 Date of Publication: June 2012.

[5] M.J. Flores J. Ma Armingol A. de la Escalera, "Driver drowsiness detection system under infrared illumination for an intelligent vehicle" Published in IET Intelligent Transport Systems Received on 13th October 2009 Revised on 1st April 2011.

[6] Eyosiyas Tadesse, Weihua Sheng, Meiqin Liu," Driver Drowsiness Detection through HMM based Dynamic Modeling." 2014 IEEE International Conference on Robotics & Automation (ICRA) Hong Kong Convention and Exhibition Center May 31 - June 7, 2014. Hong Kong, China.