e-ISSN:2582-7219

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 7, Issue 7, July 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.521

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.521| Monthly, Peer Reviewed & Referred Journal|

| Volume 7, Issue 7, July 2024 |

| DOI:10.15680/IJMRSET.2024.0707197 |

Detection of Driver Drowiness using Opencv

Deepak Murthy D.R, Prof. Sandarsh Gowda M M

P.G Student, Department of Master of Computer Application, Bangalore Institute of Technology, VVPuram, Bangalore, India

Assistant Professor, Department of Master of Computer Application, Bangalore Institute of Technology, VVPuram, Bangalore, India

ABSTRACT: Detection of driver drowsiness is among the most important road safety measures in reducing more number of accidents due to driver tiredness. In this paper presents an efficient drowsiness using OpenCV, which provides a popular open-source library in computer vision. Therefore, this system will make use of real-time video processing in tracking facial features of a driver for the detection of drowsiness. critical modules of this system are basically face landmark detection, EAR calculation, and head-pose estimation. During the process, a pre-trained deep neural network model will identify facial landmarks. Further, an EAR parameter is computed for measuring eye-blinking frequency and duration. Furthermore, head pose estimation is also use to track head movements indicative of drowsiness.by extracting these features, this system is quite accurate in drowsiness detection. The system warns the driver in time, hence reducing the chances of accidents. It makes the system very effective and inexpensive due to OpenCV, making it feasible for integration into different vehicular platforms. experiments show that with different lighting conditions and various driver appearances, the system performance is robust enough to be applied in real life. Future work will focus on improving detection accuracy and integrating the system with vehicle control mechanisms for enhanced safety

I. INTRODUCTION

Drowsiness is a condition bordering on sleep and marked by a feeling of sleepiness. It may mean the normal condition preceding sleep or the pathological condition wherein one feels sleepy irrespective of the sleep cycle. This state of drowsiness is dangerous, especially in actions demanding for continuous concentration and vigilance, like driving. At times, if a driver falls into deep drowsiness, he might doze off and increase his chances of having a road accident.

In view of this problem, many techniques have been invented for the detection or reduction of driver drowsiness, quite important for accident prevention systems. Considering the risks of drowsiness on the road, the impact of this event must be reduced applying appropriate countermeasures. The main aim of this project is to implement a system that can effectively track a driver's eye state in order to raise an alarm in advance in case he becomes fatigued.

Detection of drowsiness in the driver may prevent accidents. Facial expressions, such as closing the eyes and yawning, shall inform the system on the extent of the driver's tiredness. Yawning is a sure sign that the brain is having trouble keeping oxygen levels up to remain awake. This system shall employ the technology of facial recognition to track the movement of eyes and the mouth and determine whether they are opened or closed to ascertain if a driver is fatigued or dozing off.

Face image analysis, being a well-studied area, may have potential applications in facial recognition and anti-theft systems. For this project, attention will be paid to areas around the eyes and the mouth. This system will use algorithms that analyze image processing in detecting drowsiness. This system will detect whether the driver is tired or drowsy by locating the eyes and the mouth and determine if they are open or close

II. LITERATURE SURVEY

(“1st December 2020, FHikmat Ullah Khan”) Statistical evidence shows that driver fatigue are more common among drivers. who have spent a long time driving without rest. This is responsible for more sleep-related accidents than those caused by drunk driving. A newly developed drivers assistance system is in a position to recognize both inattentiveness and drowsiness at all speeds. The system informs the drivers about the present condition of drowsiness and the time elapsed since the last break. This system allows individual settings and, upon detecting drowsiness, alerts the driver, and it gives directions to nearby service areas on the COMMAND navigation system.

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.521| Monthly, Peer Reviewed & Referred Journal|

| Volume 7, Issue 7, July 2024 |

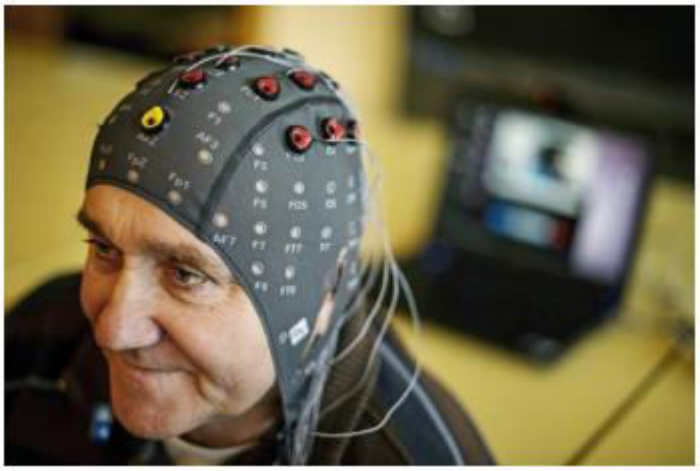
| DOI:10.15680/IJMRSET.2024.0707197 |

One of the main causes of road accidents today is due to fatigue caused by lack of sleep. This paper presents a prototype of a secure safety control to manage the speed of a car in case of the driver's fatigue. The system makes use of sensors monitoring the frequency of eye blinks, which shall indicate the somnolence of the driver. If a driver starts dozing off, a buzzer will sound, and his vehicle's ignition system will be cut off to prevent an accident

("12 December 2019, Pratyush Agarwal") Driver fatigue accounts for about a third of accidents, which has become a big highway safety problem. Alerting drivers sufficiently in advance of reaching a point where they are no longer able to drive safely would significantly reduce these incidents. Drowsiness detection depends on timely warnings for its effectiveness. Previous systems have been less impactful because they did have not account for personal variation. Basically, drowsiness detection are been classified into two broad categories: intrusive and non-intrusive. The most successful of these non-intrusive approaches involve methods such as driving pattern recording and eye characteristic recording. Of these, camera-based systems have a considerable real-world applicability rating

Various approaches have been used in detecting the drowsiness of drivers, including:
(1) vehicle related measures.
(2) activity related measures.
(3) biological related measure.

1.Drowsiness Detections for Electroencephalography (EEG):
Electroencephalography measures electrical activity in the brain and is exceedingly helpful in detecting heart rate, eye blinks, and large physical movements like nodding or shaking the head. This technique are used on human and animal subjects for brain imaging. Mainly, EEG works through proprietary hardware that surrounds the head non-contactively to read out electrical brain activity. in detecting heart rate. Basically, in EEG analysis, four frequency components are noted for consideration. An increase in power in the ALPHA and DELTA frequency bands indicates that a driver has entered into a state of fatigue or drowsiness



2. Face detection in drowsiness detection
("D. Liu, P. Sun, Y. Xiao, and Y. YinDriver") Drowsiness can be detected as laziness through facial area analysis. This method is used in detecting drowsiness through the facial region, which indicates symptoms more clearly and with finer detail. Starting with the facial area, we can easily locate the eye region. Four kinds of eyelid movements can be used in identifying drowsiness: fully open, fully closed, halfway open, and transitioning.

The algorithm processes the images in grayscale, turning them into black and white. Having a black and white image makes the work easier because there are only two parameters to measure. Through the edge detection method, edges of the eyes are detected, hence easily calculating the eyelid area

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.521| Monthly, Peer Reviewed & Referred Journal|

| Volume 7, Issue 7, July 2024 |

| DOI:10.15680/IJMRSET.2024.0707197 |

a) Open eye b) Close eye c) Processed close eye

III. PROPOSED METHODOLOGY

The proposed drowsiness detection system derives concepts from machine vision, where facial and eye movements are monitored for fatigue. Facial and ocular activities of a driver are recorded as real-time video by means of a webcam. If the system detects the driver's drowsiness, it triggers a warning signal to alert the driver. Different from other systems, this algorithm focuses specifically on the eyes within a designated facial area. If the eyes are not detected in 20 consecutive images, the system will recognize that the driver may fall asleep.

The developed system in Python will process input video recorded with a webcam. OpenCV is used for face and eye recognition. The Euclidean aspect ratio of an eye is computed to find whether the eyes are open or closed. This system traces eye movement; if the eyes are closed for a specified duration, it sounds an alarm to wake up the driver. If the system senses that the eyes are open, it will display a message "eyes open" and continuously capture video of what the driver is doing.

The following are steps that form the outlines of this methodology which can be used to achieve the project objectives. A cursory review was done on the different steps of the implementation process. How other method has been selected and used till the completion of the particular project is been described here. In the context of software implementation, the project benefits from the MATLAB CV System, using built-in MATLAB commands for face, eye, and mouth detection.

- **Setting Up the System:** A webcam is fitted in the vehicle at a position that will clearly capture the face and eye movements of the driver. The software, designed in Python with OpenCV, processes images in real-time for implementing drowsiness detection algorithms.
- **Acquiring Data:** This module captures a real-time video feed of the driver's face through the fitted webcam. Frames can be extracted from this video feed at specified intervals for further analysis.
- **Face and Eye Detection:** In each frame, the driver's face will be detected using either Haar cascades or deep learning-based models. Upon the identification of the face, other Haar cascades or CNNs narrow down their scope to detect the regions of the eyes.
- **Drowsiness Detection Algorithm:** The thresholds of EAR are defined to determine the state of an eye as an open or closed eye. In this, a series of frames is continuously processed to track the changes in the state of the eye. If eyes remain closed for a predefined number of successive frames, say 20 frames, then the driver is considered to be drowsy.
- **Alert Mechanism:** Upon detecting drowsiness, the system triggers an audible or visible warning to alert the driver. On a screen inside the vehicle, it displays the message of the state of the driver's eyes, such as "Eyes Open" or "Eyes Closed."
- **Error Handling and Optimization:** It applies image preprocessing techniques like grayscale conversion and noise reduction to improve the accurate of detection. There are provision made for customization, which involve the parameters of detection: the number of frames consecutively considered for detection and EAR threshold values, so that it may adapt to different features among drivers

IV. CONCLUSIONS

In this we have successfully realized all the system's objectives and requirements, and also our framework is reliable with all issues solved. The system will be designed to be user-friendly so every driver would find the system easy to understanding and operate. Its prime focus is toward combating the sleepiness of drivers through timely alerts about drowsiness. One major functionality delivered by this system is driver drowsiness monitoring, done through eye-movement detection. When the first signs of drowsiness are detected, such as specific eye movements or blinking, the

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.521| Monthly, Peer Reviewed & Referred Journal|

| Volume 7, Issue 7, July 2024 |

| DOI:10.15680/IJMRSET.2024.0707197 |

system triggers an alarm to awake the driver. Apart from that, it reduces the vehicle's speed and turns on the parking lights to increase safety. Hence, the strategy assists in preventing accidents and improving safety to drivers and vehicles. Although each of these safety features are found in high-end automobiles, it will show that our system can perform the task of detecting and preventing drowsiness within regular vehicles, hence providing safe driving conditions for everyone

REFERENCES

[1]W W Weirwille":" Overview of Research on Driver Drowsiness Definition and Driver Drowsiness Detection14th International Technical Conference on Enhanced Safety of Vehicles ppp". 23 - 26 Posted: 1994
[2]" Gwak, J., Hirao, A., Shino, M.": "An investigation of early detection of driver drowsiness using ensemble machine learning based on hybrid sensing". Appl. Sci. 10(8), 2890 (2020). https://doi.org/10.3390/app10082890
[3]"You, F., Li, X., Gong, Y., Wang, H., Li, H.":" A real-time driving drowsiness detection algorithm with individual differences consideration". (2019). https://doi.org/10.1109/access.2019.2958667
[4]"Kepe siova, Z., Ciganek, J., Kozak, S".:" Driver drowsiness detection using convolutional neural networks". In: 2020 Cybernetics & Informatics (K&I) (2020). https://doi.org/10.1109/ki48306.2020.9039851
[5]"Tabrizi p.r. and Zoroofi r". "A. Open/closed eye analysis for drowsiness detection"
[6] "Jay D. Fuletra.", "A Survey on Driver's Drowsiness Detection Techniques" International Journal on Recent and Innovation Trends in Computing and Communication: 1 Issue: 11 ,2013

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com