ZKG INTERNATIONAL

ISSN: 2366-1313

AN EFFECTIVE REAL TIME DRIVER DROWSINESS DETECTION USING CNN IN DEEP LEARNING ALGORITHM

SRIKANTH KILARU[1], G. DURGA[2, K]. PRASANNA LAKSHMI[3], K. RAVITEJA[4]

[1]Assistant Professor, CSE,Chalapathi Institute of Technology,Guntur, India
[2]UG Student,CSE,Chalapathi Institute of Technology,Guntur, India
[3]UG Student,CSE,Chalapathi Institute of Technology,Guntur, India
[4]UG Student,CSE,Chalapathi Institute of Technology,Guntur, India

ABSTRACT: Every year thousands of lives pass away worldwide due to vehicle accidents, and the main reason behind this is the drowsiness in drivers. A drowsiness detection system will help to reduce this accident and save many lives around the world. To defend this problem, we propose a methodology based on Convolutional Neural Networks (CNN) that illustrates drowsiness detection as a task to detect an object. It will detect and localize whether the eyes are open or close based on the Real-time video stream of drivers. The Mobile Net CNN Architecture with Single Shot Multi box Detector is the technology used for this object detection task. A separate algorithm is used based on the output given by the SSD_MobileNet_v1 architecture. A dataset that consists of around 4500 images was labeled with the object's face yawn, no-yawn, open eye, and closed eye to train the SSD_MobileNet_v1 Network. Around 600 randomly selected images are used to test the trained model using the PASCAL VOC metric. The proposed approach is to ensure better accuracy and computational efficiency.

1. INTRODUCTION

Drowsiness of the drivers is one of the key issues for majority of road accidents. Drowsiness threatens the road safety and causes severe injuries sometimes, resulting in fatality of the victim and economical losses. Drowsiness implies feeling lethargic, lack of concentration, tired eyes of the drivers while driving vehicles. Most of the accidents happen in India due to the lack of concentration of the driver. Performance of the driver gradually deteriorates owing to drowsiness. To avoid this anomaly, we developed a system that is able to detect the drowsiness nature of the driver and alert him immediately. This system captures images as a video stream through a camera, detects the face and localizes the eyes. The eyes are then analysed for drowsiness. Based on the Result, the driver is alerted for drowsiness through an alarm system.

2. LITERATURE SURVEY

From [2] titled "Real-time monitoring of driver drowsiness on mobile platforms using 3D neural networks". In this paper, they have used depth-wise separable 3D convolution operations to detect drowsiness in drivers from real-time face video and also, they have identified micro sleeps and alerted the drivers. The results obtained show that the method can decide which features are important and it does not depend on the developer to pre-specify a set of features because they might miss some features like nose wrinkles, eyelid movement, and other facial gestures. The limitations of the paper are that the dataset which is used consists of just 18 persons and

ISSN: 2366-1313

also, the frames were not labeled properly. From [3] titled "The detection of drowsiness using a driver monitoring system". In this paper, they have made use of a driver monitoring system (DMS) to detect drowsiness along with different kinds of sensors. They have also collected data in the form of signals from other vehicle-based sensors. The results obtained show that the models were effective at dividing the drowsiness into three levels - low, moderate, and severe drowsiness. But, while differentiating between moderate and severe levels, the model was not efficient enough. The limitations of the paper are that the model was not effective while differentiating moderate drowsiness from severe drowsiness. Another limitation is that the size of the sample used in this paper is small. From [4] titled "Driver Drowsiness Detection System Using Computer Vision". The objective of the paper is to detect driver drowsiness by analyzing human eye blinks using a recent facial landmark detection and to make use of E.A.R(eye aspect ratio) for easy, fast, and efficient blink detection. The results showed that the system was successful in driver drowsiness detection by providing a reliably precise enough estimation of the level of eye openness. This alert system can be used in real time due to a very negligible performance cost experienced in facial landmark detection. The limitations of the paper are that a fixed blink duration is assumed even though everyone's blink duration lasts differently. EAR is estimated from two dimensional data which cannot account for out-of-plane head orientation and the model depends only on eyes for drowsiness detection. From [5] titled "Drowsiness Detection Based on Eye Closure and Yawning Detection". In this paper, driver's eye and mouth movements are tracked using Haar cascade classifiers. This will help to detect the closing of eyes and frequency of yawning. The system also generates alarm sounds if the driver is drowsy or already asleep. As a result, in 85% of the cases, the system detects faces and facial features which are required, accurately. The system is prompt in detecting drowsiness once the feature detection of the face is positive. The limitation of the paper is that it is observed that the system's accuracy decreases in bad lighting conditions.

3 EXISTING SYSTEM

The current drowsiness detection systems include the usage of the devices that detect the respiration rate, heart rate, blood pressure, etc. These devices can cause the driver to be uncomfortable for driving. Cannot be assured that the drivers wear these devices all the time while driving. May get lost or improper functioning which may lead to low accuracy in the result. The existing system does not produce good results in low light conditions

It is purely dependent on external factors like road marking, climatic and lighting conditions.

4. PROPOSED SYSTEM

For detecting the drowsiness of the driver. First of all the system captures images through the webcam and after capturing it detects the face through It uses haar features which can detect the face. If the system founds it as face the it will proceed for next phase i.e eye detection. The eye is also detected using haar cascade features and it is used for blink frequency. Through this algorithm we can find the percentage of time the eye lids remains closed. If it found eyes in closed state then it detects driver in drowsy state and alerts him by an alarm.

This system can also be used for railway drivers. The drowsiness detection system is capable of detecting drowsiness in quickly.

The system which can differentiate normal eye blink and drowsiness can prevent the

ISSN: 2366-1313

driver from entering the state of sleepiness while driving.

5. IMPLEENTATION

1. Acquisition System:

The video is recorded using webcam and the frames are extracted and processed in a laptop. After extracting the frames, image processing techniques are applied on these 2D images. Presently, synthetic driver data has been generated. The volunteers are asked to look at the webcam with intermittent eye blinking, eye closing, yawning and head bending. The video is captured for 14 seconds duration.

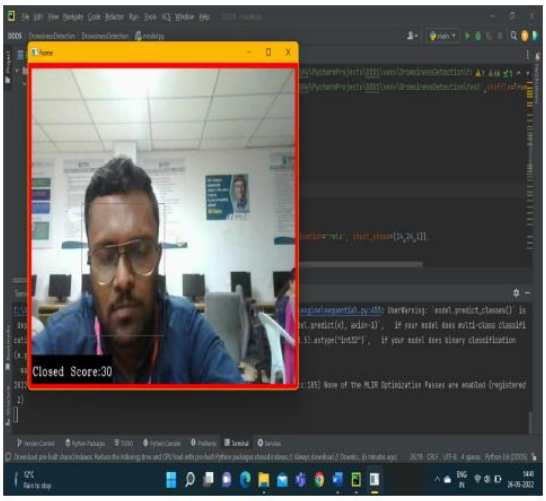
2. PROCESSING SYSTEM:

Open CV is used for the processing of the image. System makes use of the number of eye blinks for detecting the state of drowsiness in a driver. The system makes use of Open CV with a single camera view. The eye status is obtained through image processing algorithms.

3. WARNING SYSTEM:

The system immediately triggers the LED warning light module and at the same time emits a warning sound from the buzzer to warn the driver not to continue driving. This driver drowsiness detection and alert system architecture.

6. SCREEN SHORT



7. CONCLUSION

In this work, The current study developed an automated system for detecting drowsiness of the driver. The continuous video stream is read from the system and is used for detecting the drowsiness. It is detected by using haar cascade algorithm. The haar cascade algorithm uses haar features to detect face and eyes. Haar features are predefined are used for detecting different things. The haar features are applied on the image and blink frequency is calculated using perclos algorithm. If the value remains 0 for some amount of time then it detects as sleepy and alerts driver by activating an alarm. If the value remains constant for longer periods then the driver is said to be distracted then also an alarm is activated.

FUTURE SCOPE

The future works may focus on the utilization of outer factors such as vehicle states, sleeping hours, weather conditions, mechanical data, etc, for fatigue measurement. Driver drowsiness pose a major threat to highway safety, and the problem is particularly severe for commercial motor vehicle operators.

Monitoring the driver's state of drowsiness and vigilance and providing feedback on their condition so that they can take

ISSN: 2366-1313

appropriate action is one crucial step in a series of preventive measures necessary to address this problem.

REFERENCES

1. Rahul Atul Bhope, “Computer Vision based drowsiness detection for motorized vehicles with Web Push Notifications”, IEEE 4th International Conference on Internet of Things, IEEE, Ghaziabad, India, 2019.
2. Jasper S. Wijnands, Jason Thompson, Kerry A. Nice, Gideon D. P, Aschwanden & Mark Stevenson, “Real-time monitoring of driver drowsiness on mobile platforms using 3D neural networks”, Neural Computing and Applications, 2019.
3. Chris Schwarz, John Gaspar, Thomas Miller & Reza Yousefian, “The detection of drowsiness using a driver monitoring system” , in Journal of Traffic Injury Prevention (Taylor and Francis Online), 2019.
4. Aditya Ranjan, Karan Vyas, Sujay Ghadge, Siddharth Patel, Suvarna Sanjay Pawar, “Driver Drowsiness Detection System Using Computer Vision.”, in International Research Journal of Engineering and Technology (IRJET), 2020.
5. B.Mohana, C.M.Sheela Rani, “Drowsiness Detection Based on Eye Closure and Yawning Detection”, in International Research Journal of Engineering and Technology (IRJET), 2019.
6. Driver Alert Control (DAC). (2016, Feb 10). Retrieved from http://support.volvocars.com/uk/cars/Pages/owners-manual.aspx?mc=Y555&my=2015&sw=14w20&article=2e82f6fc0 d1139c2c0a801e800329d4e
7. Z. Mardi, S. N. Ashtiani, and M.Mikaili, “EEG-based drowsiness detection for safe driving using chaotic features and statistical tests,” Journal of Medical Signals and Sensors, vol. 1, pp. 130–137, 2011.
8. T. Danisman, I.M. Bilasco, C. Djeraba and N. Ihaddadene, “Drowsy driver detection system using eye blink patterns,” Universite Lille 1 & Telecom Lille 1, Marconi, France, 2010.
9. B. Hariri, S. Abtahi, S. Shirmohammadi, and L. Martel, “A yawning measurement method to detect driver drowsiness,” Distributed and Collaborative Virtual Environments Research Laboratory, University of Ottawa, Ottawa, ON, Canada, 2011.
10.L. Li, Y. Chen and Z. Li, "Yawning detection for monitoring driver fatigue based on two cameras", Proceedings of the 12th International IEEE Conference Intelligent Transportation Systems., pp. 1-6, Oct. 2009.
11.S. Abtahi, B. Hariri and S. Shirmohammadi, "Driver drowsiness monitoring based on yawning detection", Proceedings of the IEEE International Control, Measurement and Instrumentation (CMI), IEEE, pp. 1-4, May 2011.
12.X. Fan, B. Yin, and Y. Sun, "Yawning detection for monitoring driver fatigue", Proceedings of the International Conference on Machine Learning and Cybernet, vol. 2, pp. 664-668, Aug. 2007.