JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

ALERTING SYSTEM FOR ACCIDENTS CAUSED BYSLEEP DEPRIVATION AND EXHAUSTION USING PYTHON WITH WEBCAM AND MOBILE CAM

M. Lenin Babu[1], CH. Sai Murali Krishna[2], D. Praneeth Kumar[3], K. Jayaram[4], K.Aravind Swamy[5]

[1]**Assistant Professor,** Dept of ECE, Godavari Institute of Engineering and Technology(A), Rajahmundry, AP
[2,3,4,5] **Students**, Godavari Institute of Engineering and Technology (A), Rajahmundry, AP

Abstract- In recent years, one of the main contributors to car accidents around the globehas been driver weariness. Drowsiness in the driver can be used as a direct indicator of driver fatigue. To protect people and property, it is crucial to identify driver sleepiness. The project's objective is to develop a prototype sleepiness detection system. This real-time system continuously takes pictures, measures the condition of the mouth (MAR) and eye (EAR) by the predetermined methodology, and issues a warning when necessary. Although there are other ways to measure tiredness, this methodis non-intrusive and has no negative effects on the driver, thus it provides an accurate picture of their state. The value of the mouthand eye closures is taken into account for the identification of tiredness. The driver is therefore classified as tired or drowsy when the eye closing and yawning last longer thana predetermined period. Dlib is one of the OpenCV libraries used to construct this system.

Keywords: MAR, EAR, DLIB, OpenCV

1. INTRODUCTION

Road accidents frequently result from fatigued or drowsy drivers. This system presents a module for an advanced driver assistance system to reduce the number of accidents caused by driver weariness and consequently enhance transportation safety. This technology focuses on automatically detecting driver drowsiness using visual data.The suggested OpenCV algorithms successfully locate and aid in normalizing human faces while being responsible for the majority of accidents associated with auto accidents. The program begins by spotting heads on color photos by analyzing variationsin the structure and color of the background and human face [5]. Drivers are thought to show indicators of drowsiness and wearinessby making a variety of facial and body motions, including yawning and having sleepy eyes. These traits show the driver to bein poor physical condition.

Drowsiness and driver fatigue are two of themost common factors in collisions. Every year, more people lose their lives in these accidents. With a username and password, the driver drowsiness detection System administrator can access the system. The userlogs, frames, and EAR-MAR levels

are bothsaved to the administrator system.

A car safety technology called the Drowsiness Detection System works to prevent accidents that can be brought on by

drowsy driving. Several studies have suggested that drowsy driving contributes to about 30% of all traffic accidents. A significant challenge for accident-avoidance systems is the development of technologies for detecting or preventing driving while fatigued.

Because driving when fatigued is dangerous, new strategies must be devised to mitigate the impact. This project is based on an illustration of a system for sleepiness detection. The goal of this project is to create an automated system for driver safety. The system has been created.

When traveling, convenience and comfort arehighly valued. The level of safety provided by many conditions and factors, notably roadsafety, is referred to as a vehicle's comfort. The ride quality of the most comfortable and opulent automobiles is of a high caliber. An automobile with excellent ride quality is also one that is cozy to drive. The safety of any vehicle also heavily depends on how comfortable it is. With a cozy car, the driver feels more at ease and relaxed. The more comfortable and high-quality the car, the more control there will be, and the less toad disruption there will be, the better the driver'sability to handle the vehicle will be.

This project focuses on our Drowsiness Detection System, a vehicle safety element. It is a car safety feature that aids in preventingaccidents brought on by drowsy driving. Driving over extended periods causes weariness and sleepiness. The goal of this project is to create an automated system that analyses the EAR(Eye Aspect Ratio) and MAR (Mouth Aspect Ratio)[8]. The methodis set up to carefully examine the predicted ratio between the ear and mouth as well as thehead position.

2. PROPOSED SYSTEM

A computer and smartphone vision system created with the aid of OpenCV can automatically identify drowsiness in the driver or user in a real-time video stream andthen play an alarm to alert the driver or user and then instruct the driver through a pre-defined voice message. The system also saves all the sleepy and drowsy frames in thedatabase, EAR and MAR statistics, and logins of a user in an excel sheet for monitoring and reviewing the driver or user.

Benefits of the suggested System: There are no side effects for the user, Portable, low price, more reliable, simple to maintain, and simple access

2.1 Problem Definition

Today, finding drowsy drivers is perhaps the most important step in stopping any traffic accident, everywhere around the globe. Driver sleepiness is the main contributor to accidents. Major accidents can be caused by several factors, including fatigue and sleepiness.

People can now afford automobiles and bikes thanks to more accessible EMI alternatives, which add to the traffic daily. Even some manufacturers have started utilizing different marketing strategies. This increases traffic and raises thepossibility of fatal car accidents and collisions.

More people die in traffic accidents as a result of emergency vehicles arriving late due to excessive traffic on some roads. A Forbes analysis estimates that drowsy driving costs the US economy $109 billion annually and claims 5000 lives in the USA alone. According to the AAA (American Automobile Association), tiredness is a factor in 20% of all fatal accidents in the USA; given that India has a much larger population, we can only speculate on these statistics. The world's highest rate of traffic accidents (18%). With the use of modern technology, this project will address the issueof accident detection and collision avoidance.

2.2 Objective

With the creation and assessment of a drowsy driver model system, this thesis seeks to advance driver behavior research whiledriving. The drivers' comfort leads to themethod of choosing non-intrusive. The research's findings will be used to create systems that are effective at identifying drowsiness early on by

alerting users to their lack of focus owing to drowsiness or other circumstances. In other words, people can cease driving while they are drowsy or change their conduct.

The system must be resistant to model mismatch, disruptions, and comfort restrictions.

This study's goal is to determine howdrowsiness is currently detected by looking into flexible techniques for examining the connections between a driver's actions while the car is moving and physiological driver sleepiness levels.

3. RESULTS

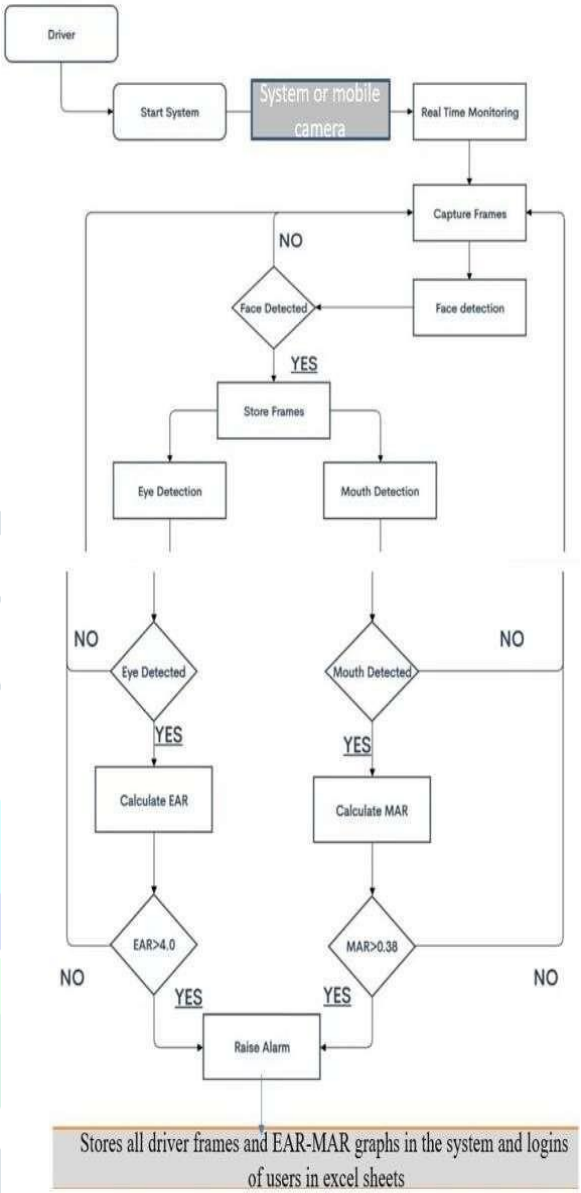

Fig1: System Architecture

Fig2: Yawning frame with EAR and MARgraph using a webcam

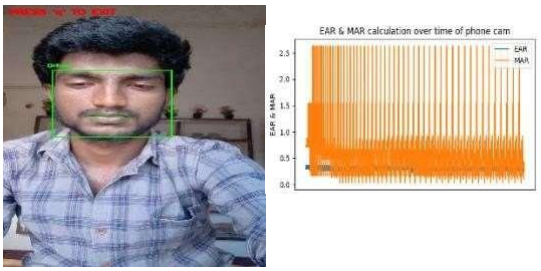

Fig5: Sleeping frame with EAR and MAR graph using smartphone cam

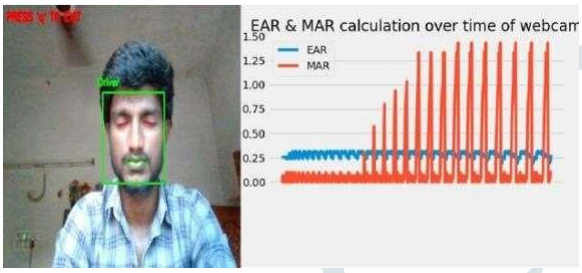

Fig3: Sleeping frame with EAR and MARgraph using a webcam

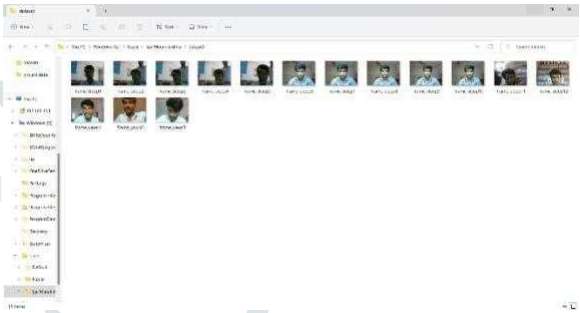

Fig6: Webcam dataset

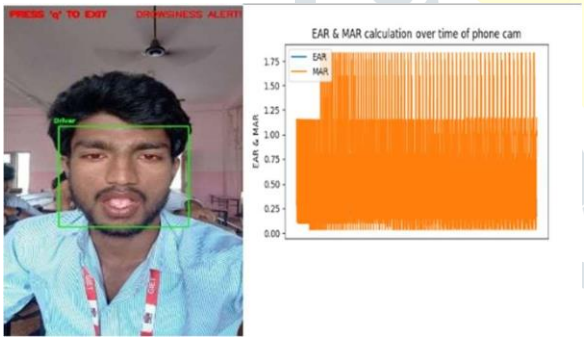

Fig4: Yawning frame with EAR and MARgraph using smartphone cam

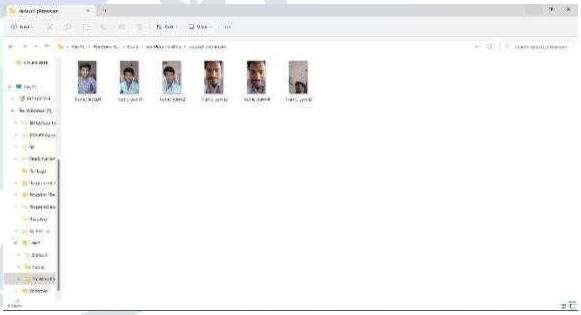

Fig7: Smartphone dataset

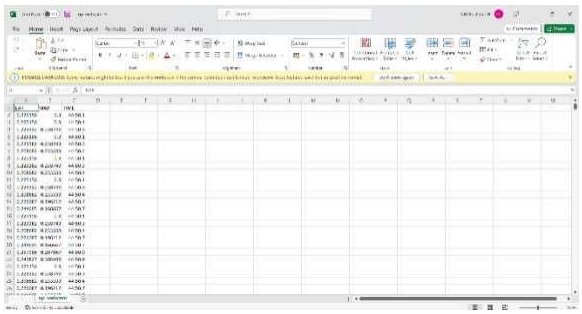

Fig8: Excel sheet of EAR and MAR levelswhile using a webcam

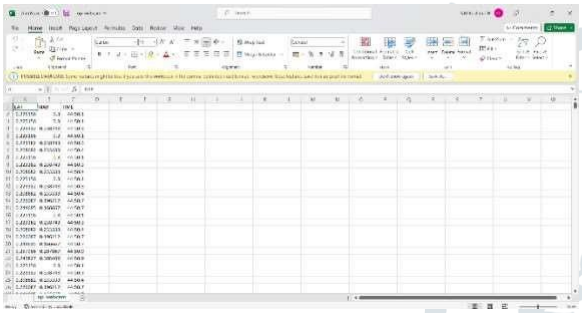

Fig9: Excel sheet of EAR and MAR levelswhile using smartphone cam

Experimental result full video link:

https://drive.google.com/file/d/1ZXRlB7yx6xv9jKJzJBfFqDPbQgq36pl1/view?usp=share_link

4. CONCLUSION

The developed driver abnormality monitoring system can quickly identify drowsy driving behavior. The DrowsinessDetection System was created based on the driver's yawning and closing of their eyes, and it can distinguish between typical drowsiness-related mouth movements and eye blinks. The suggested system can stop accidents brought on by drowsy driving. If the camera produces superior results, the system works well even when the driver is wearing eyeglasses and in low light. Many in-house image processing methods are usedto collect information about the position of the head and eyes. The device detectswhether the eyes are open or closed while being monitored. A warning signal is given when the eyes are closed for an extended period. Based on continuous eye closures, processing determines the driver's level of awareness.

5. FUTURE SCOPE

By incorporating artificial intelligence into the project, it is possible to advance it even further and analyze human sleep patterns as well as the movements and pupillary dilation. Future research may concentrate on the use of environmental variables including vehicle conditions, sleeping patterns, weather, mechanical data, etc. for measuring tiredness.Highway safety is seriously threatened by driver drowsiness, which is especially dangerous for drivers of commercial vehicles. This major safety problem is a result of 24-hour operations, high annual mileage, exposure to difficult environmental conditions, and rigorous work schedules. One key stage in this process is to keep an eye onthe driver's level of alertness and tiredness and give them feedback on their situation so they can take the necessary actions. Several preventive steps are required to deal with this issue. Currently, the camera's zoom ordirection cannot be changed while it is in use. The eyeballs may be automatically zoomed in on after they have been located infuture work.

6. REFERENCES

[1] S. R. Paul, Drowsy Driver Technologies Program at NHTSA

[2] https://en.wikipedia.org/wiki/Driver_drowsiness_detection.

[3] Hitendra Garg. 2020 International Conference on Power Electronics & IOT Applications in Renewable Energy and its control (PARC), Mathura, Uttar Pradesh, India, "Drowsiness Detection of a Driver Using Traditional Computer Vision Application."

[4] Hybrid Fatigue: A True Detection Using Transfer Learning and Hybrid Features by Qaisar Abbas Vol. 11, No. 1, 202 of the International Journal of Advanced ComputerScience and Applications.

[5] Design of Real-Time Drowsiness Detection System Using Dlib, 2019 5th IEEEInternational WIE Conference ComputerEngineering, 15-16 Nov 2019, Bangalore, India, by Shruti Mohanty, Shruti V Hegde, Supriya Prasad, and J. Manikandan.

[6] Detection Using Percentage Eye ClosingMethod, International Conference on Communication and Signal Processing, Chennai, India, K. Sakthi Dasan, N. Vasudevan, and V. Nagarajan.

[7] 2019 Bangkok, Thailand, 1st International Symposium on Instrumentation, Control, Artificial Intelligence, and Robotics. Camera.

[8] Theekapun Charoenpong, Chamaiporn Sukjamsri, Wisaroot Tipprasert, and Chamaporn Chianrabutra

A Technique for Detecting the Driver's EyesClosing and Yawning for Infrared Drowsiness Analysis.

[9] Franklin Alert System for Driver's Drowsiness Using Visual Processing by Ratna Kaavya M., Ramya V., and Ramya G. Vellore, India: 2019 International Conference on Vision Toward New Trends inCommunication and Networking, March 2019.

[10] Specular Reflection Detection and Substitution: A Key for Accurate Medical Picture Analysis. Oak P., Iyer B. (2020).