DROWSINESS DETECTION SYSTEM USING OPEN CV

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1. ABSTRACT

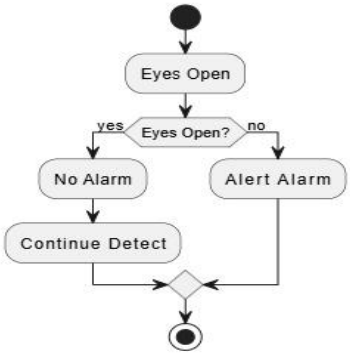
There is a need to implement a Drowsiness Detection System because in a single day an average of 40% of accidents happen in India due to Drivers falling asleep while driving soto tackle this issue this project aims to alert the Driver when he is in a drowsy state. The primary focus is to detect the driver's behaviour using real-time video capturing using asensor(Open CV Module in Python). By combining the input of facial data an alarm will be played if the driver is in a drowsy state or sleeping. This project can improve Road Safety and decrease the chance of accidents.

2. INTRODUCTION

Drowsiness while driving is a sensitive problem that may lead to severe road accidents. A Drowsiness Detection System is employed to actively respond to prevent accidents by detecting whether the driver is in a drowsy state or not.

This project focuses on designing an intelligent system that captures real-time video of the driver. The system uses sensors (Open CV module) that detect the face of the Driver and alerts with an alarm whenever the Driver falls into a drowsy state.

So, implementation of this project can improve road safety and reduce the risk of accidents because in India for a single day 40% of accidents occur due to drivers falling



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asleep. Rather than using critical Machine Learning algorithms Open CV is the best approach to respond to the project because it involves real-time computer vision tasks[1-27].

3. LITERATURE SURVEY

Title	Authors	Published Year	Objective	Limitation	Advantage
Driver Drowsiness Detection Model Using Convolutional Neural Networks Techniques for Android Application	Jabbar, R., Shinoy, M., Kharbeche, M., Al-Khalifa, K., Krichen, M. and Barkaoui, K.	2020	Discusses about utilizing facial landmarks which are detected by the camera and that is passed to a Convolutional Neural Network (CNN) to classify drowsiness.	Obstructing the view of facial features by wearing sunglasses and bad lighting conditions is the limitations.	The model that is presented here has achieved an average of 83.33% of accuracy for all categories where the maximum size of the model did not exceed 75KB.
Trends and Future Prospects of the Drowsiness Detection and Estimation Technology	Toshiya Arakawa	2021	Discusses about usage of Logistic regression to calculate eye closure.	Cost of sensors is high	current mass-produced technologies and main detection and estimation methods used for arousal detection.
Modern drowsiness detection techniques: a review	Jasim, Sarah Saadoon, and AK Abdul Hassan	2022	Discusses about Initial consideration should be given to the many sorts of existing supervised detecting techniques that are now in use and grouped into	it was noticed that vehicular features can give good results if it is not affected by the road circumstances.	By applying large dataset with a good feature selection method can improve the accuracy of the classifier.

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			four types of categories (behavioral, physiological, automobile and hybrid) and the second ML classifiers are used.		
System and Method for Driver Drowsiness Detection Using Behavioral and Sensor-Based Physiological Measures	Bajaj, Jaspreet Singh, Naveen Kumar, Rajesh Kumar Kaushal, H. L. Gururaj, Francesco Flammini, and Rajesh Natarajan.	2023	focused on two approaches to identify driver drowsiness during the last decade: intrusive and non-intrusive. The intrusive approach includes physiological measures, and the non-intrusive approach includes vehicle-based and behavioral measures.	Each measure has limitations in different contexts and is ineffective in detecting drowsiness	The outcome shows that the proposed hybrid model is capable of identifying the transition from awake to a drowsy state in the driver in all conditions with the efficacy of 91%.
A Survey on Drowsiness Detection – Modern Applications and Methods	Biying Fu, Fadi Boutros, Chin-Teng Lin and Naser Damer	2024	Discusses about researched works into three measuring techniques, with multi-channel EEG signals, ECG signals, and vision-based detection schemes	Confusion may arise between the terms driver fatigue detection and driver drowsiness detection	Summarized and compared popular benchmarking databases and common evaluation metrics used to assess the performance of the developed drowsiness

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					detection algorithms.
MHI Driver Drowsiness Detection System	Torbati, H.M., Nejad, A.Z.S., Sadeghnejad, S. and Nejad, A.Z.S	2025	Discusses about portable aurdinal set with camera.	Cost is High	advantage is that drivers will not need smart cars because it is a portable device.

4. PROBLEM STATEMENT

The goal of the Drowsiness detection system is to help drivers avoid accidents caused by sleep deprivation and fatigue. According to traffic safety reports gradual increase in road accidents due to drivers falling asleep or losing focus. With the rise in workload and greed in getting trips of transportation to earn more income drowsiness detection has become an important aspect of promoting road safety.

Current systems for detecting driver drowsinessislacking real-time response capabilities. There is a need for efficient and affordable solutions to detect early signs of drowsiness and to prevent potential accidents.

5. EXISTING SYSTEM

There are several existing systems that utilize various technologies to monitor driver's drowsiness. One of them uses facial landmarks which are detected by the camera and that is passed to convolutional neural networks to classify drowsiness. Another one uses logistic regression to calculate eye closure.

Some other uses for supervised detecting techniques that are grouped into (behavioural, physiological, automobile, hybrid) and machine learning classifiers. Multichannel EEG signals and ECG signals and vision-based detection schemes.In all

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these some are expensive and other are having complex hardware which aims to alert driver while he is a drowsy state.

6. PROPOSED SYSTEM

The proposed system for the Drowsiness detection system requires OpenCV, which is a computer vision library along with a machine learning algorithm (Haar cascades) to monitor the driver's facial expressions in real time. By using a webcam camera, the system will track the eyes i.e. continuous closer duration, and head movements. The system will process video frames to analyze these features and provide a state of alertness. Instead of using complex hardware, using OpenCV and a webcam is more affordable which makes it easy to access. It also involves real-time face detection which ensures the system detects a drowsiness state. It fits in the various platforms of vehicles, workplaces, etc.

7. CONCLUSION

This project provides hands-on experience in building the Drowsiness Detection System using a powerful Python library OpenCV and Haar Cascades machine learning algorithm. Implementing this can enhance road safety and ensure drivers can focus only on driving. The system provides real-time alerts to prevent accidents due to drivers falling asleep or in a drowsy state.

With the help of computer vision techniques system can efficiently monitor the face of the driver and alertness levels. In terms of performance accuracy of the Drowsiness Detection System is approximately 90%. The precision depends upon lighting conditions and if in case the driver is wearing sunglasses or not.

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REFERENCE

1. Ramzan, Muhammad, et al. "A survey on state-of-the-art drowsiness detection techniques."
2. Jabbar, Rateb, et al. "Driver drowsiness detection model using convolutional neural networks techniques for android application."
3. Arakawa, Toshiya. "Trends and future prospects of the drowsiness detection and estimation technology."
4. Jasim, S.S. and Hassan, A.A., 2022. "Modern drowsiness detection techniques: A review."
5. Bajaj, Jaspreet Singh, et al. "System and method for driver drowsiness detection using behavioral and sensor-based physiological measures."
6. Fu, Biying, et al. "A survey on drowsiness detection–modern applications and methods."
7. Saini, V. and Saini, R., 2014. "Driver drowsiness detection system and techniques: areview."
8. Deng, W. and Wu, R., 2019. "Real-time driver-drowsiness detection system using facial features. "
9. Fatima, B., Shahid, A.R., Ziauddin, S., Safi, A.A. and Ramzan, H., 2020. "Driver fatigue detection using viola jones and principal component analysis."
10. Kaplan, R.F. and Loparo, K.A., Consolidated Res of Richmond Inc, 1998. "Alertness and drowsiness detection and tracking system."
11. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima" A Brain Tumor Identification and Classification Using Deep Learning based on CNN-LSTM Method" Computers and Electrical Engineering , 101 (2022) 107960
12. Ramdas Vankdothu,.Mohd Abdul Hameed "Adaptive features selection and EDNN based brain image recognition on the internet of medical things", Computers and Electrical Engineering , 103 (2022) 108338.
13. Ramdas Vankdothu,.Mohd Abdul Hameed,Ayesha Ameen,Raheem,Unnisa " Brain image identification and classification on Internet of Medical Things in healthcare system using support value based deep neural network" Computers and Electrical Engineering,102(2022) 108196.

doi: 10.48047/ijiee.2025.15.4.51

14. Ramdas Vankdothu,.Mohd Abdul Hameed" Brain tumor segmentation of MR images using SVM and fuzzy classifier in machine learning" Measurement: Sensors Journal,Volume 24, 2022, 100440 .
15. Ramdas Vankdothu,.Mohd Abdul Hameed" Brain tumor MRI images identification and classification based on the recurrent convolutional neural network" Measurement: Sensors Journal,Volume 24, 2022, 100412 .
16. Bhukya Madhu, M.Venu Gopala Chari, Ramdas Vankdothu,.Arun Kumar Silivery,Veerender Aerranagula " Intrusion detection models for IOT networks via deep learning approaches " Measurement: Sensors Journal,Volume 25, 2022, 100641
17. Mohd Thousif Ahemad ,Mohd Abdul Hameed, Ramdas Vankdothu" COVID-19 detection and classification for machine learning methods using human genomic data" Measurement: Sensors Journal,Volume 24, 2022, 100537
18. S. Rakesh [a], NagaratnaP. Hegde [b], M. VenuGopalachari [c], D. Jayaram [c], Bhukya Madhu [d], MohdAbdul Hameed [a], Ramdas Vankdothu [e], L.K. Suresh Kumar "Moving object detection using modified GMM based background subtraction" Measurement: Sensors ,Journal,Volume 30, 2023, 100898
19. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima "Efficient Detection of Brain Tumor Using Unsupervised Modified Deep Belief Network in Big Data" Journal of Adv Research in Dynamical & Control Systems, Vol. 12, 2020.
20. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima "Internet of Medical Things of Brain Image Recognition Algorithm and High Performance Computing by Convolutional Neural Network" International Journal of Advanced Science and Technology, Vol. 29, No. 6, (2020), pp. 2875 – 2881
21. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima "Convolutional Neural Network-Based Brain Image Recognition Algorithm And High-Performance Computing", Journal Of Critical Reviews,Vol 7, Issue 08, 2020(Scopus Indexed)
22. Ramdas Vankdothu, Dr.Mohd Abdul Hameed "A Security Applicable with Deep Learning Algorithm for Big Data Analysis",Test Engineering & Management Journal,January-February 2020
23. Ramdas Vankdothu, G. Shyama Chandra Prasad " A Study on Privacy Applicable Deep Learning Schemes for Big Data" Complexity International Journal, Volume 23, Issue 2, July-August 2019
24. Ramdas Vankdothu, Dr.Mohd Abdul Hameed, Husnah Fatima " Brain Image Recognition using Internet of Medical Things based Support Value based Adaptive Deep Neural Network" The International journal of analytical and experimental modal analysis, Volume XII, Issue IV, April/2020
25. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima" Adaptive Features Selection and EDNN based Brain Image Recognition In Internet Of Medical Things " Journal of Engineering Sciences, Vol 11,Issue 4 , April/ 2020(UGC Care Journal)
26. Ramdas Vankdothu, Dr.Mohd Abdul Hameed " Implementation of a Privacy based Deep Learning Algorithm for Big Data Analytics", Complexity International Journal , Volume 24, Issue 01, Jan 2020

doi: 10.48047/ijiee.2025.15.4.51

27. Ramdas Vankdothu, G. Shyama Chandra Prasad" A Survey On Big Data Analytics: Challenges, Open Research Issues and Tools" International Journal For Innovative Engineering and Management Research,Vol 08 Issue08, Aug 2019

doi: 10.48047/ijiee.2025.15.4.51