International Journal of Innovative Research in Engineering
Volume 3, Issue 6 (November-December 2022), PP: 122-125.
www.theijire.com ***ISSN No: 2582-8746***

Driver Drowsiness Detection System

Anubhav pandey[1], Ankur Singh[2], Aditya Singh[3], Ajay Kumar[4]
[1,2,3] Student, Department of Computer Science and Engineering, ITM Gida Gorakhpur, Uttar Pradesh, India.
[4]Assistant Professor, Department of Computer Science and Engineering, ITM Gida Gorakhpur, Uttar Pradesh, India.

How to cite this paper:
Anubhav pandey[1], Ankur Singh[2], Aditya Singh[3], Ajay Kumar[4], "Driver Drowsiness Detection System", IJIRE-V3I06-122-125.

Abstract: *One of the main factors in road accidents is drowsy driving. It poses a major threat to road safety. If motorists could be forewarned before becoming too fatigued to drive safely, some of these collisions might be avoided. It depends on the prompt transmission of drowsiness warnings in order to accurately detect drowsiness. The lack of consideration for individual characteristics has up till now hampered the efficacy of sleepiness detection technologies. Drowsiness detection can be easily divided into the two categories of intrusive and non-intrusive technologies depending on the type of data employed. Non-intrusive methods are used during the survey to gauge tiredness by observing driving behaviors and occasionally ocular features. The ideal way is a camera-based detection system, which is applicable to real-world driving scenarios. The creation of a prototype drowsiness detection system is the project's main goal. This system, which is real-time, continuously captures images while measuring the eye's condition using the stated methodology and issuing warnings as necessary.*

Keyword: *Drowsy Driving; Drowsiness Recognition; Driver monitoring, Varying Luminance Conditions.*

I.INTRODUCTION

Drowsiness is defined simply as "a state of near sleep due to fatigue." The effects of weariness and sleepiness are extremely similar. Fatigue impairs mental awareness, making it harder for someone to drive safely and raising the possibility of mistakes being made that could result in fatalities or serious injuries. Sleepiness impairs judgement, reduces awareness, and slows reaction times. All transportation professionals, such as airline pilots, truck drivers, and train engineers, are affected by fatigue and sleep deprivation. In both situations, the motorist is unable to concentrate on the primary task of driving, which may increase the chance of a collision. This issue will get worse due to the constantly increasing traffic. To reduce accidents caused by driver drowsiness, it is vital to build a driver alertness system as shown in fig .1.

Fig.1 Example of Driver Drowsiness (Source-Internet)

One of the key strategies for keeping us safe in cars is the interaction between the driver and the vehicle, such as monitoring and supporting one another. Although the number of fatalities in traffic accidents has decreased as a result of active safety systems in cars, the number of collisions is continuously rising.

II.LITERATURE SURVEY

[1]. An analysis of **"A Partial Least Squares Regression-Based Fusion Model for Predicting the Trend in Drowsiness" by** Hong Su et al. **from 2008 was published.** Partial least squares regression, an information fusion methodology, was offered as a new method for predicting driver tiredness with numerous eyelid movement variables (PLSR), with this can be used to address the issue of strong collinear linkages among eyelid movement characteristics and, consequently, forecast the likelihood of drowsiness. The model is verified based on its prediction accuracy and resilience, which demonstrate that it offers a novel method of combining many characteristics in order to improve our capacity to coincide and forecast the state of drowsiness.

[2]. Bin Yang et al.published a **description of "Camera based Drowsiness Reference for Driver State Classification under Real Driving Conditions" in June 2010.** Under simulator or experiment conditions, they claimed, measurements of the

driver's eyes may be used to identify drowsiness. In-vehicle fatigue prediction measures based on the most recent eye tracking technology are evaluated for performance. These measures are evaluated statistically and by a classification method based on a sizable dataset of 90 hours of actual road driving. According to the findings, eye-tracking sleepiness detection is effective for some drivers as long as the blinks detection is accurate. However, there are still issues with poor lighting and for people wearing glasses, despite some proposed changes. As a whole, the camera-based sleepiness measures offer a valuable addition to a drowsiness reference, but they are not trustworthy enough to serve as the only reference.

[3]. **In 2011**, M.J. Flores et. al. Described "**Driver sleepiness detection system for an intelligent vehicle using infrared lighting".** They suggested that in order to decrease the number of such fatalities, a module for an advanced driver assistance system be introduced. This module would cater for automatic driver fatigue detection as well as driver distraction. The driver's face and eyes are located, tracked, and analyzed using artificial intelligence algorithms to compute the sleepiness and distraction indices. Due to the fact that it operates in real-time, it can be used at night a method for illumination in the near infrared in conclusion, some photographs of various drivers taken at night in a genuine car to support the proposed algorithms, examples are provided.

[4]. Cheng et al. wrote about **"Driver Drowsiness Recognition Using Computer Vision Technology" was published in June 2012.**They demonstrated an eye-tracking and image processing-based non-intrusive sleepiness identification technique. To deal with the issues brought on by variations in lighting and driving posture, a reliable eye detection algorithm is introduced. Six measurements are computed using % of eyelid closure, longest period of closure average level of eye opening, frequency of blinking velocities of the eyes while opening and closing. Fisher's linear differentiated functions are used to combine these measurements in a stepwise manner in order to lessen correlations and derive an independent index. Results from trials with six participants in a driving simulator show that this video-based sleepiness recognition system, which had an accuracy rate of 86%, is feasible.

[5]. **In June, 2014**Eyosiyas et. al. **'Driver Drowsiness Detection via Dynamic Modeling' was described.** They put forth a fresh approach to assessing the driver's facial expression through dynamic modelling that is Hidden Markov Model (HMM) based in order to identify sleepiness. A driving simulator was used to implement the method. The efficacy of the suggested strategy was confirmed by experimental findings.

[6]. **In August 2014**, García et. al. **'Driver Monitoring Based on Low-Cost 3-D Sensors' was detailed**. Based on 3-D data from a range camera, they presented a method for driver monitoring and incident detection. In order to enable head position estimate and regions-of-interest recognition, the system integrates 2-D and 3-D approaches. The points belonging to the head are identified and extracted for additional analysis based on the acquired cloud of 3-D points from the sensor and examination of the 2-D projection. Later, using the iterative closest points approach, a head pose estimation with three degrees of freedom (Euler angles) is computed. Finally, pertinent facial features are located and employed for additional analysis, such as behavior analysis and event detection. A 3-D driver monitoring system based on inexpensive sensors is the end product. It represents an intriguing instrument for studies on human factors that enables automatic analysis of certain characteristics and the detection of unique events involving the driver, such as sleepiness, inattention, or head posture.

III.METHODOLOGY

The creation of an intelligent car that can detect driver fatigue and stop distracted driving is one way to address this major issue. How many eyelids there are one of the main approaches for spotting tiredness in drivers is the closure over the pupil over time. In general, audible sound vibrations or warning messages on a display are used to warn the driver to concentrate on driving or to take a break when drowsiness is detected while driving. These techniques make it possible for drowsy drivers to quickly avoid accidents caused by their condition, but simply being aware of it does not always help. The majority of the methods require a lot of equipment, which is impractical for real-world applications, as we discovered from the literature review. Additionally, because the majority of researchers take images with the camera fixed in front of the driver's field of vision, it is difficult to assess the feasibility of most approaches that rely on camera input for the recognition of opening and shutting eyelids.

The process of building DRIVER DROWSINESS DETECTION SYSTEM has two stages, first the training of the neural network and then the prediction of driver Drowsiness.

Convolutional neural network

Convolutional neural networks (CNNs, also known as ConvNets) is a type of deep neural networks that are most frequently used to analyze visual data. Multilayer perceptron variants formalized into CNNs. The term "multilayer perceptron" typically refers to networks that are fully linked, so that every neuron in one layer is connected to every neuron in the layer from above. These systems are connected to included and because their "fully-connectedness." However, CNNs approach technique similarly; they make use of the data's hierarchical pattern to piece together more complicated patterns from smaller, simpler ones. CNNs are therefore at the lower end of the connectivity and complexity spectrum.

To extract the states of the mouth and eyes from the ROI images, a convolutional neural network called EM-CNN is proposed. Two measures utilized for fatigue detection are the mouth opening degree (POM) and the percentage of eye closure over the pupil over time.

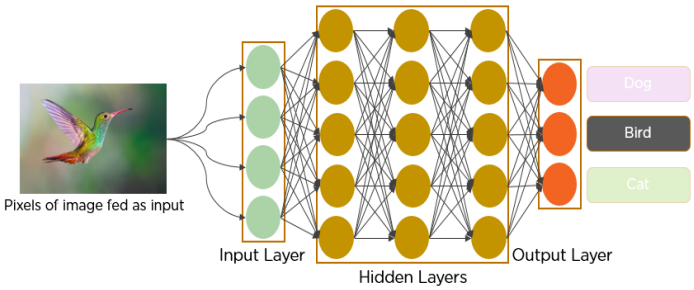

Fig: - Working of CNN(Source-Internet)

Image Capture:

The driver can be seen and/or recorded on camera within the car.We are working with a real-time scenario where video is being recorded and must be processed. However, an algorithm can only be processed or applied to an image. As a result, the captured video needs to be broken up into frames for analysis.

Face detection:

We identify the area containing the driver's face at this stage. Every frame's face detection uses a specific algorithm. Face detection refers to the process of identifying a face in a frame or, put another way, locating facial characters using computer technology. Any frame at random could be the frame. All other types of things, such as buildings, trees, and bodies, are not identified; only structures or features associated to the face are picked up**.**

Eye Detection:

After a face has been successfully detected, the eye must be found for additional processing. The decision parameter for determining the driver's state is in our technique eye. Even though eye detection might be simpler to find, it's actually rather difficult. At this stage, it uses the identification of a number of features to carry out eye detection in the necessary specific location.

State of eye:

In this stage, we determine whether the eye is actually open or closed. The recognition of eyes is the most crucial requirement. Convolutional neural networks enable this network. If we discover that the eyes are closed, we channel a warning message. If When the system notices that the eyes are open, the procedures are repeated until the system discovers a shut eye.

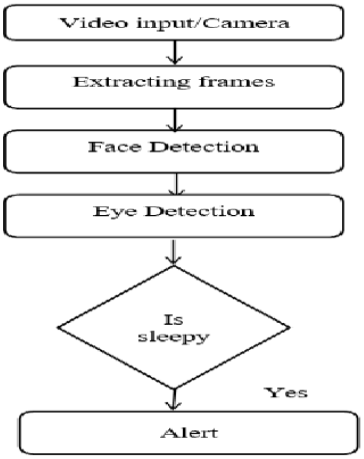

Fig. 2 flow chart of state of eye detection (Source-Internet)

Existing System & Disadvantages

In present time very costly system are present that can detect drowsiness. These existing systems are not easily available for every car driver.

Advanced System And Advantages

System that is efficient and secure.

light weight code, Simple method.

Easy implementation due to freely available hardware and software.

An efficient system to identify user alertness based on fatigue detection.

VI.CONCLUSION

Numerous techniques to identify sleepiness have been suggested in earlier studies. After doing a literature review, various methods for spotting drowsy drivers have been discovered.

Data of many kinds as input for their programmed. Following an analysis of numerous techniques, it was discovered that employing a camera is the most effective, practical, and situation-appropriate technique. We made the decision to investigate this computer vision technique, and we came up with a commendable way to identify drowsy driving based on the detection of eyelid closure and opening utilizing convolutional neural network as a classification algorithm. The video frames from the camera, which could be fixed so that it wouldn't hinder the road view, are first acquired for this study.

The outcomes were as follows:

Drowsiness can be detected using image processing in a highly accurate and reliable manner.

The model can identify drowsiness by having an attention on the face and eyes. Methods for shape prediction are used to identify significant facial features.Mainly our project is designed with the goal of reducing the rate of accidents and helping in the development of technology.

References

1. *World Health Organization. Road Safety: Basic Facts.; 2016 (http://www.who.int/violence_injury_prevention/publications/road_traffic/Road_safety_media_brief_full_document.pdf).*
2. *"A Survey on State-of-the-Art Drowsiness Detection Techniques," M. Ramzan, H. U. Khan, S. M. Awan, A. Ismail, M. Ilyas, and A. Mahmood, IEEE Access, vol. 7, pp. 61904-61919, 2019.*
3. *A. Degada and V. Savani (2015). An Embedded Technology and ICT Approach to the Design and Implementation of a Low-Cost, Portable Telemedicine System The 5th Nirma University International Conference on Engineering (NUICONE) was held in 2015. (page 1 - 6). IEEE, Ahmedabad, India.*
4. *P. Kang, Y. Wei, and Z. Wei (2017). Based on Embedded Networking and Qt Technology, this control system for granary ventilation. The 29th Chinese Control and Decision Conference (CCDC) was held in 2017. (pages 2275 - 2280). IEEE, Chongqing, China.*
5. *I. Jaziri, L. Chaarabi, and K. Jelassi (2015). Embedded Linux and FPGA are used to control a remote DC motor. The 7th International Conference on Modelling, Identification, and Control (ICMIC) was held in 2015. (pages 1 - 5). IEEE, Sousse, Tunisia.*
6. *R. R. Itkarkar and A. V. Nandi (2016). A survey of 2D and 3D imaging used in human-computer interaction hand gesture recognition (HCI). WIECON-ECE 2016 is the 2016 IEEE International WIE Conference on Electrical and Computer Engineering (pages 188 - 193). IEEE, Pune, India.*
7. *Zuo, H. (2016). (2016). HCI software interface implementation based on image identification and segmentation algorithms. International Conference on Green Engineering and Technologies (IC-GET) 2016 Online (pages 1 - 6). IEEE, Coimbatore, India.*
8. *"Squeezenet: Alexnetlevel accuracy with 50x scaling," F. N. Iandola, S. Han, M. W. Moskewicz, K. Ashraf, W. J. Dally, and K. Keutzerpp. 1-13 in Proceedings of the International Conference on Learning Representations, 2017.*