# Driver Drowsiness Detection

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**Abstract - Driver drowsiness detection is a vehicle safety technology designed to reduce accidents caused by fatigued drivers. According to WHO in India found that 28% of driver had an at least met one accident of drowsiness and about to 5% of driver had an accident or near miss due to sleepiness. Studies suggest that fatigue is a factor in up to 20% of all road accidents, and even higher on certain roads. These systems use various methods to monitor the driver's state and provide alerts when drowsiness is detected. Common approaches include monitoring facial features with cameras to detect closed eyes or yawning to identify changes that indicate reduced alertness, or a combination of these techniques. If the system detects a drowsy driver, it will typically raise an alarm and advise the driver to take a break.**

## INTRODUCTION

The Accident cause serious injury and maybe death of the passenger and the driver which can ruin a family. Drowsiness is a one of the reasons for an occurrence of the accident. Specially in the Truck driver and the taxi driver. this type of driver works almost full of night and many times they cannot sleep properly due to the client and many times to earn the more money, due to this negligence driver meet the accident which may lead them to serious injury or sometime to death. This type of accident can harm the opposite the driver and his passenger or family.

Drowsy driving presents a major threat on the road, leading to potentially life-threatening accidents. Statistics show that fatigue is a contributing factor in a significant portion of these incidents. To address this critical issue, researchers are developing innovative systems for driver drowsiness detection.

## LITERATURE SURVEY

Drowsiness refers to feeling sleepy or tired or unable to keep your eye open.

There are various method to check the drowsiness. Some of the approaches which are used in this domain are discussed here.

Eye Aspect Ratio (EAR):

The Eye Aspect Ratio (EAR) measures eye opening and closing, rapidly changing during blinks. Our method calculates EAR using distances between eye landmarks to detect blinks and identifies drowsiness if the eyes remain closed beyond a set time threshold.

Physiological Approach

In this approach, physiological signals are collected from the driver and analysed to predict the behaviour. Features like electrocardiography (ECG) and electroencephalography (EEG) are included for better performance.

Steering wheel data In this method, the data is extracted from the movements of the steering wheel of the vehicle. This is another method to find the movement of the vehicle and can be used to assess the driver's state. The effects of the type of roads are removed from the data and can be used to classify the state of the driver.

Support Vector Machines (SVM)

Support Vector Machines are also based on Machine Learning for classification problems. The eyes or the face can be classified using SVM. There is a margin which acts as a boundary that differentiates various classes. SVM tries to maximize this margin. This is also a widely used classifier but it does not work well when it comes to large datasets.

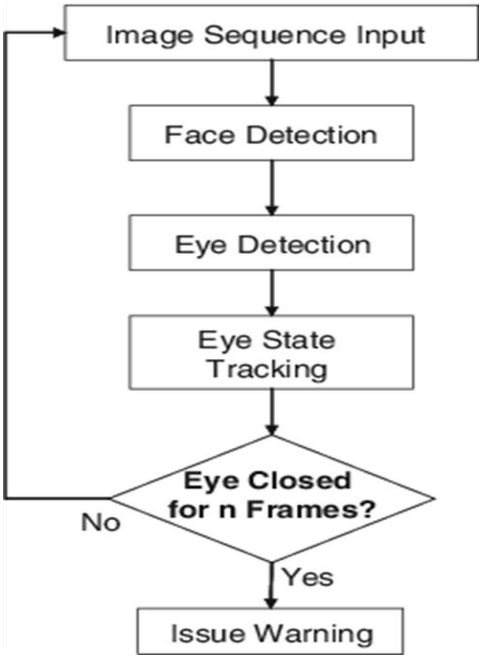
Artificial Neural Networks (ANN)

Artificial Neural Networks are Deep Learning techniques which are inspired by the functionality of human brain and neurons. These neural networks have hidden layers which are used for feature extraction. The main disadvantage of ANN is that it can't work very efficiently with 2D data.

## METHODLOGY

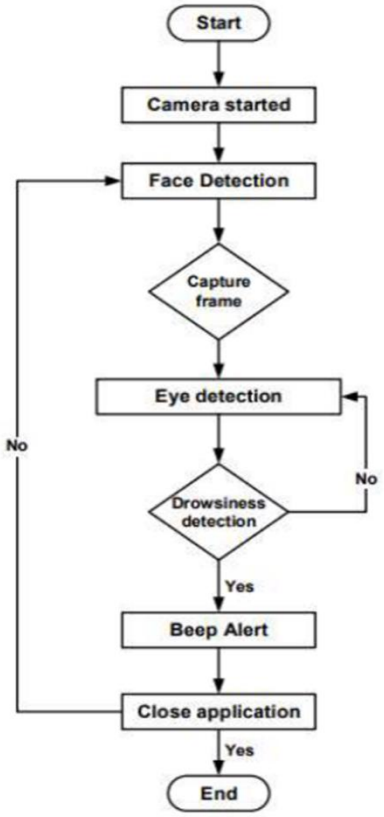
To detect the driver drowsiness we use the Arduino and buzzer to alert the driver.

Firstly we detect the image through the webcam then follow the following parameter to check the driver is drowsy or not.
Head leaning for long time.
Eye blinking frequency.
Continuously yawning.




The driver drowsiness detection system is simple to operate. It captures video of the driver's face using a webcam to monitor eye blinks and sound an alarm if drowsiness is detected. This system uses machine vision-based techniques to focus on the driver's face and eyes, identifying whether they are open or closed. The detection process uses Python and focuses on the face. A webcam records the driver's face, and if the face is not detected for several frames, the system assumes the driver is asleep . If the eyes remain closed for a specified time, an alarm sounds to alert the driver. The system employs PERCLOS (percentage of eyelid closure over the pupil over time) to detect gradual eyelid closures. Based on the PERCLOS score, the system triggers an alarm. Key libraries used include OpenCV for computer vision tasks, OS for operating system interactions, Keras for neural network operations, NumPy for array manipulation, and Pygame for multimedia functionality.

In this paper, we utilize several libraries, including:
CV2: OpenCV is an open-source library widely used in machine learning, computer vision, and image processing. It can analyze images and videos to detect people, objects, and more.
OS: Python's OS module facilitates interaction with the operating system. It is one of Python's standard utility modules, providing a portable way to use operating system-specific functionalities.
Keras: This high-level neural network library, based on Python, works with TensorFlow. It is known for its focus on user experience and is widely adopted in the industry, capable of running on both CPUs and GPUs.
NumPy: A Python library for working with arrays, NumPy includes support for matrices and various linear algebra functions.
Pygame: It includes libraries for handling graphics and sound.




CONCLUSION

A driver drowsiness detection system is crucial for preventing accidents caused by drowsy drivers. This technology uses image processing to measure the Eye Aspect Ratio (EAR) to detect drowsiness and trigger an alarm, reducing the risk of injuries and accidents. Although the current system effectively detects

drowsiness and alerts the driver, the EAR threshold for triggering the alarm varies among individuals. Future improvements should include automatic threshold determination to personalize sensitivity and enhance road safety for all drivers.

## REFERENCE

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